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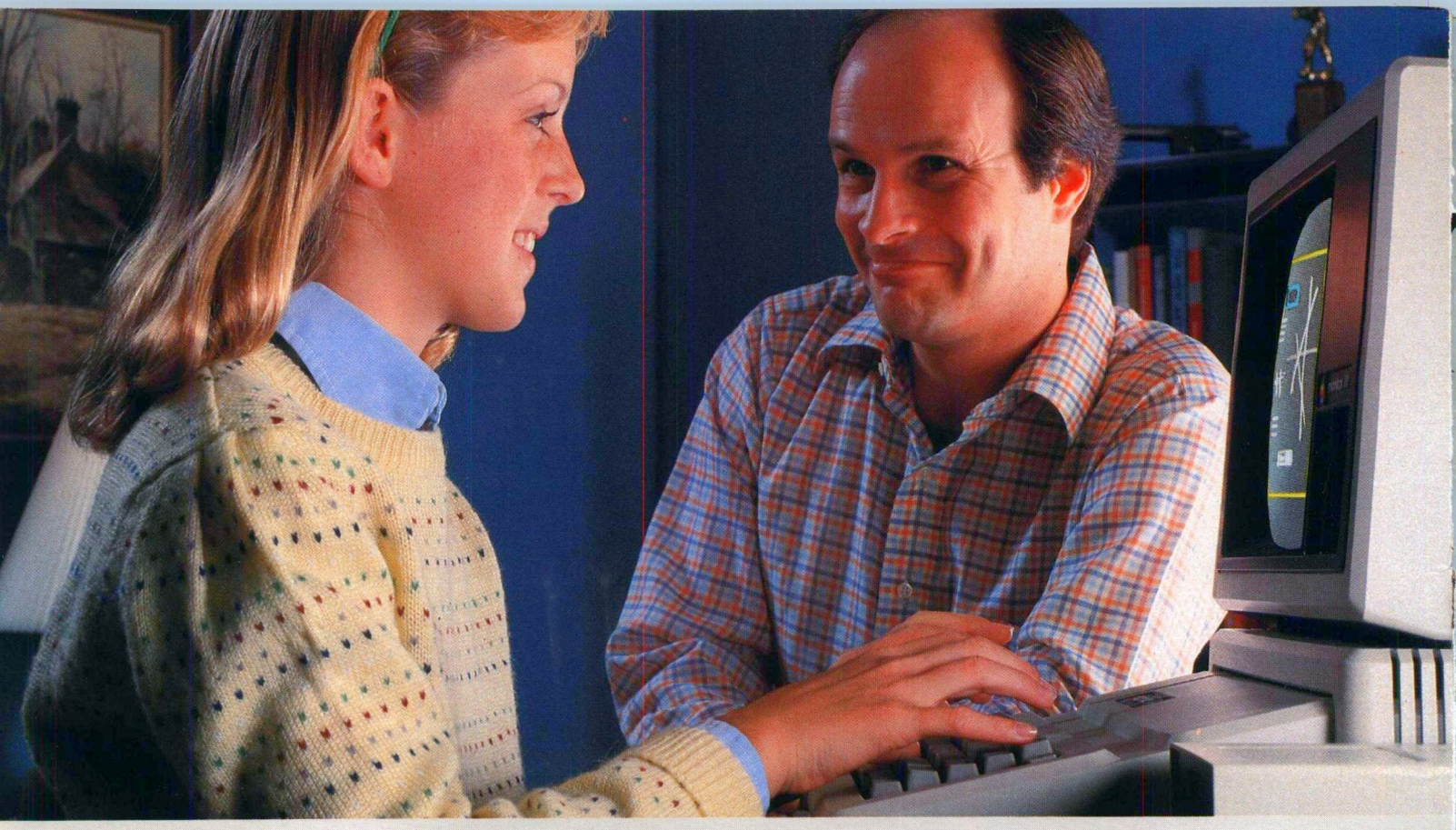

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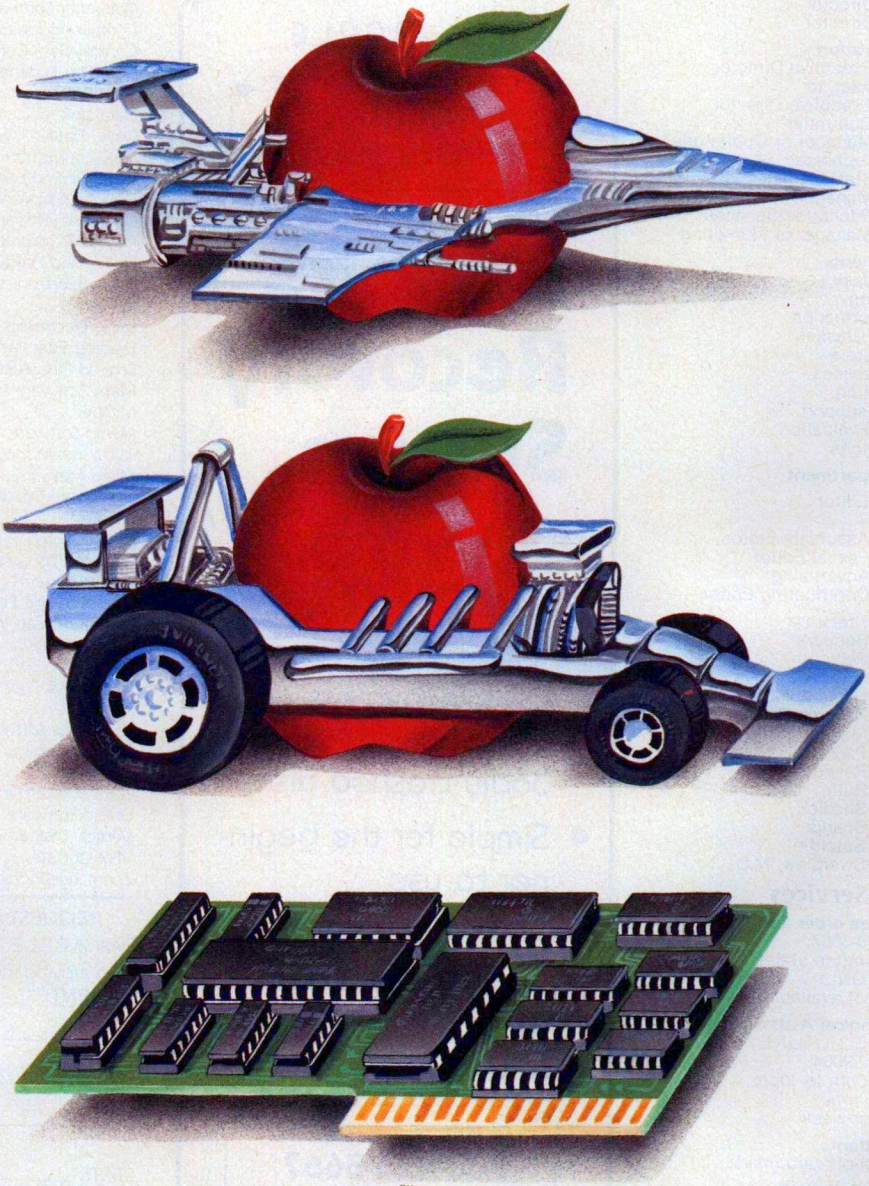

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THE EDITOR BYTES BACK

the editor

C is a Pascal-like, procedure-oriented programming language but with somewhat more flexibility than Pascal and far more universal in its application. Heading off our holiday issue, staff writer **Jim Hockenhull** explores and explains some of its intricacies, and next month reviews the **Aztec C Compiler** implementation on the Apple.

The Data Processor is the final chapter of **Ken Kashmarek's** exploration into the world of data as seen through the eyes of **PFS.** Also on the cover, our **Business Feature Section** continues and introduces **Jeffrey Jacques' Data Analysis, part 1** as his second series under the title of **THE Spreadsheet Sheet,** his ongoing column.

Stowe Keller, who seems to be knowledgeable in just about every aspect of Apple computing, brings you his **High-Res Slide Show,** a menu-driven program that selects high-res pictures of your choice — just like the $40 and up commercial programs — and displays them for you in jig time, while elsewhere in our **Technical Section, Sam Vass Exploits TASC,** Microsoft's well-known compiler, and shows how to modify it to use the infamous **Input Anything Routine** to your advantage.

Of course we have our **Education Section,** ably assembled by **Kathryn Hallgrimson Suther,** and you'll note in this issue that we have created a **Letters Section,** where for your convenience we have grouped together those popular features **A.P.P.L.E. Doctor, Write A.P.P.L.E.** and **Writing the Wrongs.**

Tod Wicks of Palo Alto, California, is the winner of our $100 credit for A.P.P.L.E. products because his name was drawn from the August Reader's Choice Cards. Let this serve as a reminder that you could be the lucky winner next time around if you return the Reader's Choice Card from this issue. Your valuable input is requested.

Next month we are going to feature some interesting applications of the Apple at Seattle's Pacific Science Center, and in February we will be bringing you information on the 68000 16-bit microprocessor used by **Lisa** and **MacIntosh,** so uh-uh-uh, don't touch that dial!

Notice

'Tis the season to be jolly. . . etc., and traditionally we close our A.P.P.L.E. offices between Christmas and New Years, this year falling between December 23rd and January 1st. You may place orders over our 800 toll-free order line, but please remember the 800 line operators do **not** have access to order records and do **not** have product information.

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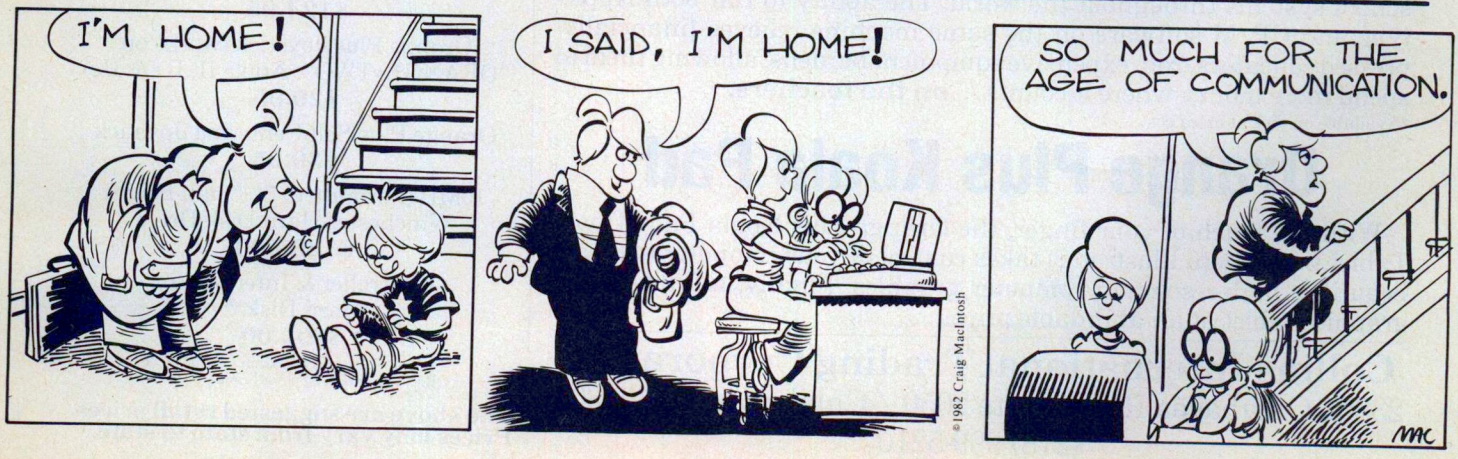
BOOT

Craig MacIntosh



Educational News

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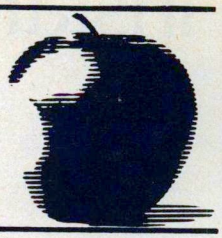

Val J. Golding

HAVE you seen our super holiday catalog yet? Presumably you have, and have taken note of the many new products we have made available for you. These include (after a year-long search for suitable quality and price) an 80-column card that is Videx compatible, the **Koala Pad** (we hope to have a review in this issue), the *Videx* **Ultra-Term** 160-column card (if 80 columns is good, then 160 has to be double good!) and the **Disk Recovery System.**

The **Koala Pad** is one of the most intriguing products we have seen for quite some time. It plugs into the game paddle port of your Apple][or *IIe* and is a tool for drawing high-res pictures with a stylus and includes such niceties as automatic color selection and fill and expandable standard shapes like circles and squares. It comes with complete software support and we have other programs available as well. At $95 it is a real bargain and a fine stocking-stuffer.

As noted earlier, we hope to include a review of it in this issue, which brings us to another topic. Are we beating our own drums? You bet we are, and what better forum to play them. We daily receive dozens of telephone questions about our products, and a review in *Call -A.P.P.L.E.* is an ideal method to pass the answers on to our members. In future issues we intend to publish brief reviews of several of the quality products members may purchase.

As usual we have a monthly member special in this issue, which we will talk about in the next few paragraphs, and it is worth noting that the *special* price does *not* appear in our holiday catalog, thus it can pay you to read *Bytes From A.P.P.L.E.* each month.

Crashed disks can sometimes be a disaster. Even when you have a backup disk (which is an absolute must), on occasion the backup may also crash or perhaps not have the most recent data. There are several excellent programs around (such as *Bag Of Tricks*) which can go a long way in assisting recovery, but all such programs we have seen have one major shortcoming: RWTS is used to read each data sector on a disk, and if the sector header information has been damaged, RWTS can not read it. Until now, there has been no alternative.

Enter **Diskette Recovery System.** For the first time a technique has been developed to read data from a sector while ignoring the address and data fields. What this means is that the chances of a near-100% recovery are greatly increased in many cases. The real beauty of **DRS** lies in its design objectives:

- Users should need to know nothing about disk or file internal structures.
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- The original damaged disk should not be altered.

All recoverable files, including deleted files, will be recovered (a deleted file may contain the next-to-newest version of your work of art). Recovered files are "graded" as to useability. For the technical minded, the documentation concisely explains step-by-step each of the recovery methods.

We used **DRS** earlier today and recovered much of a badly damaged disk we had given up on, even with all of the tools we have available to us. The moral is: Here is a program you can't afford to be without, particularly if your application involves data files. Moreover, you can run into the situation where a disk crashes and you already have a backup available (which we always try to do) of a previous version, so you go back one step and spend an hour or so (re-)making the modifications to the older version. No more. **DRS** is so automatic there is no longer a need to waste that hour. Time is money, particularly if your application pertains to your own business.

So "here come 'da special." You can get DRS between now and February 28th at our special introductory price of $32.50, a savings of $3.50.

Another innovation coming next month, and we'll tell all then, but for now, let's say you will be able to subscribe for six months or a year in advance to a *Call -A.P.P.L.E.* monthly diskette at very attractive prices. This will enable you to have our published programs on hand at the same time your *Call -A.P.P.L.E.* arrives. In addition, some of our source files are long enough so that we just don't have space to print them.

As usual, we have exceeded the space allotted to us; unfortunately we always have more to tell you about than space permits. However, at a recent meeting we were discussing how we could better determine the types of products, both hardware and software, that our members were most interested in, and we came to the conclusion that this column was the proper medium, so here it is: Drop us a note in the mail, attention "Bytes From A.P.P.L.E.," and tell us where your interests are. We promise to read each and every letter so addressed, and if we see a trend toward a specific peripheral or software product, we will put the wheels in gear and go out and search for a product that satisfies our standards and meets our members needs. Please keep in mind that A.P.P.L.E. is a membership organization and that when we can improve our member services or product line, we will. Your input is highly valued.

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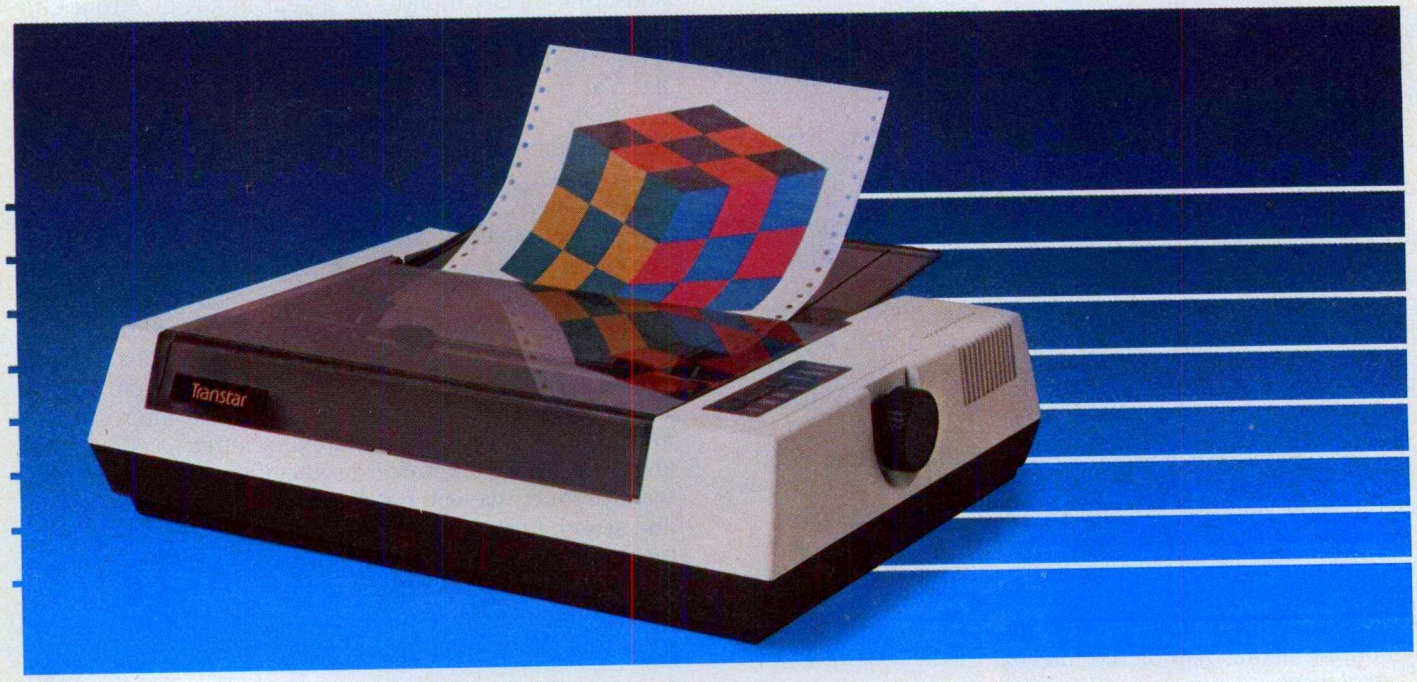

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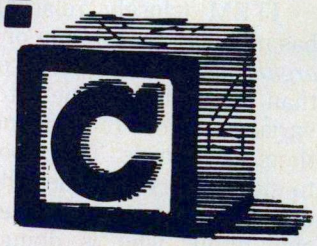

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Introduction

SOME people believe the limited power of an eight-bit microcomputer is further limited when programs are written in interpreted BASIC. These mavericks get excited whenever a new language becomes available, especially a language originally developed for much larger systems. The purpose of this pair of articles is a review of one such, the Aztec C Compiler from Manx Software Systems. For the review to be meaningful, however, an introduction to the C programming language is in order. And for *that* to be meaningful, some comments must be made about BASIC and programming languages in general. As a result, the article has been written in installments. The review itself will appear in Part 2.

Part 1 gives a broad overview of C and how it compares to BASIC. The reader will *not* become an instant C programmer nor learn too much about the gritty details of C syntax; references are supplied to handle such things. Even so, the trip covers a lot of territory, a whirlwind tour but, I hope, a scenic one.

What is a Language?

As we set off, let me define a couple of terms used in this article. "BASIC," without qualifiers, refers to interpreted BASIC, Apple's two versions in particular. And "language system" means a programming language that is up and running on a real genuine computer. A language system is comprised of two parts: the language itself and its implementation.

A programming language is a carefully defined formal system which specifies "parts of speech" — nouns (data objects), verbs (operators, commands), and conjunctions (control structures) — and the grammatical or "syntactic" rules by which these can be combined into meaningful, or at least "legal" expressions, statements, and programs. A language is a rather abstract entity existing in its pure form only in books and in the minds of programmers. To be useful, this abstraction must be made concrete through its implementation on a computer.

Implementation requires that the computer perform a number of activities. Means must be provided for entering *source code* text from the keyboard and for editing it. When the source has been entered correctly, a *translator* must convert it into executable machine language (usually, though not always accurately, called *object code*). Translators come in two basic flavors: *compilers,* which translate the entire source file into a file of object code, an operation that need be done only once if the source is correct; and *interpreters* which translate the source code one statement at a time, as the program is running, an operation performed every time the program is executed. Compiled code is like a book which has been translated from, say, Spanish to English. The interpretive process is more like listening through headphones to a speech at the United Nations. Presiding over all will be some kind of *command interpreter* which allows the programmer to select among the tasks and communicate with the computer.

In a compiling system, the various functions of the implementation are usually quite distinct. In an interpretive environment they tend to fuse together, losing their individual identities. When this happens, it is easy to mistake the language for the implementation and vice versa. I believe this is what lies behind the oft-heard statement "BASIC is easy to learn."

What is BASIC?

As a language, BASIC has relatively few "parts of speech" and a fairly simple syntax. Whether this is virtue or vice depends on whom you talk to. (Realize that in one context X = 2 [assign the value of 2 to the variable x] is an assignment statement, yet in another context it is an expression of equality. This is certainly simple syntax, but it may not necessarily be a great idea.) BASIC also has a number of ingrained characteristics which are undeniable impediments to the design of sensible, understandable, maintainable programs.

ITEM: BASIC, being an offshoot of Fortran, one of the more archaic of extant programming languages, does not reflect modern thinking about the control of program flow. Of the three control structures proven necessary and sufficient to "structured" design, BASIC provides about one and a half. The rest must be cobbled together out of GOTOs, leading to confusing code and, worse, confused thought.

ITEM: All BASIC variables are *global;* all parts of a program have equal access to them. Many other languages support *local* variables known only to, say, a certain subprogram. Locals are created when the subprogram is called and destroyed when it returns to its caller. This feature greatly reduces the possibility of a subprogram having unseen, unwanted side effects. It also allows the creation of "libraries" of prewritten routines without concern over conflicting variable names.

—◉→

"C" WHAT I MEAN?

ITEM (closely related): BASIC has no means of passing or returning *arguments* to its subroutines other than assigning values to (global) variables before the call and fetching them afterwards. This, too, can lead to side effects, impedes the creation of libraries, and causes general confusion about who is doing what to whom.

ITEM: There is a significant difference between the language and what can be written in it. For example, BASIC includes real live functions, such as RND(n), which take arguments and return values. But you can't write such things in the language. (I realize that Applesoft's DEF FN command meets these objections but only in a very limited way.)

ITEM: BASIC hides its internal workings and those of the computer from the user. Where *is* variable X? What gyrations must be performed to link machine code to a BASIC program? For many purposes this is not a severe disadvantage. Indeed, a case can be made that it's a benefit. But for applications where time is critical, for the creation of new data types or structures, and for generally milking the max out of a small computer such system-level access is necessary.

ITEM: There is no longer such a thing as standard BASIC. And the ever-increasing number of (incompatible) variations, extensions, and mutations convince me that this list of BASIC's flaws is more than mere personal opinion.

I also believe that the above items combine to make BASIC *hard* to learn, or at least easy to make mistakes in. Where, then, does the persistent notion come from that "BASIC is easy to learn"? From its usual implementation as an *interpreted* language, that's where!

While an interpreted BASIC program resides in main memory it can be examined, massaged, fondled, and prodded, and it *responds*! When it is running you can interrupt it, check on the status of variables and flow of control, and send it back on its merry way. Should a run-time error occur, all parts of the program can be checked out to see what happened. Certain BASIC instructions can be entered as immediate commands from the keyboard. In short, interpreted BASIC is *interactive*.

You can talk to it and it will talk back to you. Hence it is easy to learn and use. (I would go so far as to say that were it not for interpretive language systems there would have been no microcomputer revolution.) *But* it is the implementation that causes this interactive friendliness, not any particular property of the abstract language BASIC which, as we've seen, has some very real drawbacks. Other language systems, Forth for example, are even more interactive than BASIC; a case could be made that they're easier or, at least, no harder to learn.

Of course, all this friendliness comes at a price. Since an interpreter performs the translation of source to object while the program is running, execution time slows down considerably. Furthermore, because of the way the BASIC interpreter works, the program runs even slower as it gets longer, as more variables are used, as more subroutines are added, even as comments are written. (After all, a REM has to be interpreted like any other instruction.) A penalty is extracted for many good programming habits. To lessen the penalty, "clever" BASIC programmers resort to familiar subterfuges: grouping most-used variables and subroutines at the beginning of the program, writing multi-statement lines, eliminating comments. You've seen such "optimized" code; it makes a Forth program read like a good novel! Though it may be "easy to learn," BASIC can quickly teach you to be a bad programmer.

What is C? (I)

C is the language of UNIX, Bell Laboratories' famous multi-user operating system. Over 90% of UNIX is written in C, giving it the reputation of a language for systems programming. It is that but has proven to be an effective general-purpose language as well. Its generality is attested to by the fact that C is the language of choice for a majority of graduate students in Computer Science at Washington State University, even though no courses are offered in it.

Being a general-purpose language, C naturally has many features in common with BASIC (and other languages) although the syntax of specific items will vary. Getting acquainted with these kinds of features is rather straightforward — the "Oh, I see! You use a semicolon instead of a colon" sort of thing. But C also introduces some concepts unfamiliar to a programmer who knows only BASIC. These include:

BLOCKS. C statements can be grouped together into *blocks*, compound statements which can be used like a single statement. Blocks are delimited or framed by right- and left-facing curly braces ({ }) eg:

```
{ statement1; statement2;
statement3; }
```

MODERN CONTROL STRUCTURES. It has been proven that three control structures are sufficient for writing any program: the *sequence*, the *conditional*, and the *loop*. C supports these in clear, carefully delimited versions, along with some variations. *Sequence* is trivial: one statement follows another. The *conditional* takes the form **if . . . else . . . ; then** is implied, else is optional. The *loop* comes in two forms: with the looping condition tested at the top (**while . . .**) or at the bottom (**do . . . while . . .**). A counting loop (**for . . .**) is available, as is a multi-way conditional branch or case statement, called **switch** in C.

Structured programming is sometimes dismissed as mere academic pedantry, but experience tells me that once you use these modern control structures you'll never want to do without them.

Oh, yes! C includes a (gulp!) **goto** instruction! The less dogmatic among computer scientists admit that **goto** has its place, but that place is *not* as a major control structure.

TYPE DECLARATION. The type of data a variable is to contain must be declared explicitly, usually at the beginning of a block of code. Primary data types are characters (**char**), integers (**int**), floating-point (**float**), long and short integers, and double-precision floating point. The statement:

```
int x, y, z
```

creates three integer variables named x, y, and z.

Secondary data types include **arrays** of primary types; **structures** composed of mixed data types, similar to Pascal's "records" and **unions**, variables which may hold any one of a number of different types.

SCOPE. Scope refers to the extent to which a variable may be accessed by different parts of a program. It is not a consideration in BASIC where, as we've seen, all variables are global. But good practice suggests that subprograms should be kept as "ignorant" of one another as possible, passing only the data they need back and forth through carefully prescribed channels to avoid unwanted side effects. C allows us to control a variable's scope by declaring its *storage class*.

The default storage class, which does not have to be declared explicitly, is *automatic* (**auto**), the standard sort of local variable which exists only while the block of code in which it has been declared is active. Locals help avoid side effects, eliminate problems of conflicting variable names, and permit recursion, the writing of subprograms which call themselves.

Other storage classes are **static**, external (**extern**), and **register**. Static variables have the same scope as automatics but retain their values between subprogram calls. Externals are, for all practical purposes, global variables. Register variables are highly system-dependent and not strictly necessary to C programming. I won't discuss them here.

POINTERS. A pointer is a variable containing the address of another variable, used as a means of indirect access. If **x** is a variable and **px** is a pointer to **x**, then the *content* of **px** is the address of **x**, and the *content of the content* of **px** is the value of x. Get it? Well, think about it.

Pointers are sometimes ranked with the **goto** as a sure way to get in a heap o' trouble, but they do have valid and powerful applications. They are used extensively in advanced C programming.

(Many BASIC programmers simulate this feature. When you see code like

```
POKE PEEK(-1234),0: POKE(PEEK
(-1233)*256),0
```

you are looking at a "BASIC pointer" in action.)

FUNCTIONS. All C subprograms are called *functions*. They are equivalent to functions and procedures in Pascal but differ from BASIC's subroutines in that they are provided with explicit means for *parameter passing.*

For the sake of illustration, let's define a nonsensical C function which accepts a single integer *argument*, adds 3 to it, and *returns* the sum:

```
foo(n)    /* name & argument list */
int n     /* argument is an integer
             */
{ return(n + 3); }
          /* function body */
```

The function's name is **foo**. Its argument list, enclosed in parentheses, contains a single item, **n**, a *formal parameter* which is a sort of "bucket" waiting to be filled with an actual value when the function is called. In our type declaration we say that the bucket can hold an integer. (Incidentally, **n** is, by default, an automatic or local variable. It exists only while **foo( )** is active and is not accessible to other functions.) The body of the function is framed in curly braces and consists, here, of a single statement saying to return the value **n + 3**.

If **x** is an integer variable, the expression **foo(x)** will *evaluate* to **x + 3**. If **x** is set equal to 5, the statement:

```
y = foo(x);
```

will set **y** equal to 8; **x**, however, will still equal 5, because C passes its arguments *by value*. A copy of the argument's value is handed over to the function; the variable itself remains untouched. Again, side effects are avoided. Of course there are times when you want a function to alter its argument; C provides such facilities but they must be used deliberately.

Programming in C consists of defining functions. Every program must have at least one, called **main ( )**, where execution begins. Argument lists may be empty but they must be present.

Our silly example points out a few other things about C code, particularly that it is sensitive to the *case* of its characters. Instructions and most names are in lower case; custom dictates some specific uses of upper case. C comments are framed by /* and */. C source code may be formatted to the programmer's taste, unlike Apple's BASICs. Thoughtful formatting does much to make a program understandable.

LIBRARIES. Although C is a general-purpose language it does not try to include facilities for every conceivable programming need. Rather its designer chose to keep the language small so that it would be easy to define, easy to learn, and easy to transport among different machines. The results can often be quite startling. For example, C has no provisions for the input and output of data! All such "extras" must be written as functions. Consequently, there exists a standard library of useful functions which, though not part of the C language, are part of every C installation.

The standard library and files of other functions may be joined to a program as they are needed. To explain how this is done we must take a look at C's implementation.

What is C? (II)

Even though a language is different from its implementation, the line of demarcation may not always be as clear as theoreticians would have us believe. C's standard library is a case in point: it is not part of the language, but a C package is not complete without it, and C programmers count on its presence. Another such feature is the C *preprocessor*, a program which, prior to compilation, searches through C source code looking for statements it can interpret and execute — sort of a language within a language. The preprocessor allows us to *include* other files of source code into our program, to *substitute* one string for another, and to define *macros*.

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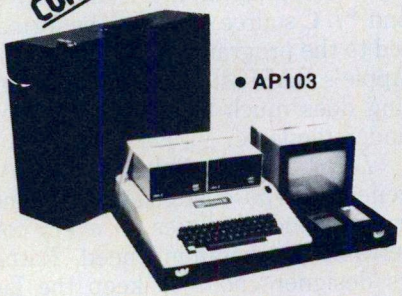

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"C" WHAT I MEAN?

Commands to the preprocessor begin with the "pound sign" (#). The command:

```
#include "stuff"
```

will insert the file called "stuff" at that point, assuming such a file exists. The line:

```
#include <stdio.h>
```

is seen at the beginning of most C programs. It causes the "standard input/output header" file to be included; angle brackets (< >) tell the preprocessor to look in a special system-dependent place for the file.

The preprocessor can search the source for a particular string and replace it with another before turning the code over to the compiler:

```
#define PI 3.14159
```

will replace all occurrences of **PI** with **3.14159**. Thus we can create *symbolic constants* (customarily written in upper case) to avoid using those "magic numbers" which are so hard to understand and modify in a program. The inevitable overhead is paid during preprocessing, not at compile time and certainly not at run time.

Even parts of C itself can be renamed this way. A Pascal freak could tell the preprocessor to:

```
#define BEGIN {
#define END }
```

so that his C source could be made to look a little more familiar.

Because **#define** causes an actual substitution of one string for another, the strings can be quite complex, including expressions or statements. **#defines** can even be constructed to take arguments, thus becoming *macros* and serving in place of true functions. The preprocessor is certainly one of C's more charming features (even though it's not part of C!).

Ending of Part 1

Whew! A whirlwind tour indeed! And with a lot left unsaid. In the next exciting installment we'll examine C's implementation a bit more, look at some actual programs, and find out how successfully the Aztec C package moves this "big kid's" language down to the Apple][. In the meantime, if I've managed to catch your interest you might take a look at some of the references below, particularly/*The C Primer.*/"C" you next month. Get it?

References

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A gentle explanation, specific to a particular micro implementation.

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A recent book, very clearly written. *The* place to start.

Kernighan, Brian, and Dennis Ritchie. *The C Programming Language.* Englewood Cliffs, NJ: Prentice-Hall, 1978.

The standard (and for years the only) work on C. Ritchie is C's designer. The book is friendly but is written by and for systems programmers; others may feel confused and stupid. Nevertheless, it *must* be part of every C user's library.

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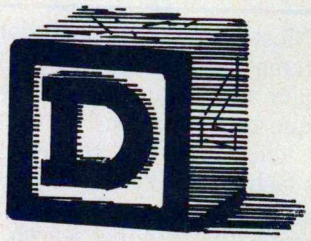
Ritchie, D.M., S.C. Johnson, and B.W. Kernighan. "UNIX Time-Sharing System: the C Programming Language." *Dr. Dobb's Journal,* #45, pp. 20-29.

A concise but detailed description of C.

D IS FOR DATA:

The Data Processor



Ken Kashmarek/Call —A.P.P.L.E. staff writer

THE end is in sight. This month's edition of D Is For Data will bring to a close our series on data storage and retrieval techniques. This entire adventure began with a journey into Personal Finance Manager plus the contents and layout of PFM.DATAFILE. As you recall, this is a DOS allocated text file with binary data stored in the data sectors (instead of the familiar character data with high bit on). From that humble beginning, our travels carried us to Storage Access Unlimited, where we processed every file type known to DOS with &OPEN/CLOSE and &READ/WRITE. In our last episode, we strayed Down The Data Path with &GET/PUT to manipulate the contents of a data sector buffer.

This month's rendition will pull it all together to process PFM.DATAFILE in its entirety. The only part left out will be the data entry function of PFM. Well, almost the only part. If this utility did everything, why would you need PFM? In any case, with PFM.DATAFILE Utility, you can now extract Personal Finance Manager data and use it with your other financial tools.

Data Processing Techniques

Data files can be processed either sequentially, or randomly. Sequential access (sometimes referred to as consecutive) is performed beginning with the first record in the file and continues until the last record is processed. Processing is performed according to how the data records are physically stored. Random access (sometimes referred to as direct access) is performed by processing any selected record in the file. With direct access, any record in the file can be read and updated without processing other records. PFM employs both techniques with PFM.DATAFILE. The data file is a random access file, but portions of it are processed sequentially.

The first 18 sectors of the file are read sequentially into memory. This portion of the file contains selected summary information and control information for the rest of the file. When PFM terminates, these 18 sectors are written back to the file. Random access to this data is performed directly on this 4608 byte area of memory.

Each month of data is accessed directly. The sector number for the beginning of a month is 18+month *20 where the previous year's entries are month 0, January is month 1, etc. The first 26 bytes of sector #0 (13–two byte counters) indicate the number of entries in each month. PFM can compute which sector in a month will be used for the new data items during data entry. New entries are added following the previous data and the data sectors are written out as each is filled (10 entries per sector).

Occasionally, an entry is deleted from the file. PFM will make use of the empty slot by moving all the data up in a particular month. A check (or other) entry may also be updated. Whenever a deletion or update is performed, the changed data sector is immediately written back to the diskette.

One other significant point: the date value in each entry is the first major key for placing the entry in the file. If the current month is May, and a new entry is dated somewhere in June (or any other month), then PFM uses the month value to store the data record in the proper location in the file. This is why PFM does not allow the date field to be changed in edit mode. New entries are always placed at the end of the current entries for any particular month. The entries within a particular month may be out of sequence by day of month if they were entered out of sequence.

But Wait, There's More . . .

One of the major benefits of a direct access file is the ability to find a particular record without reading the entire file. In this capability, PFM is only partially successful. One of the features of a data base or data management package is the ability to inquire on the data in the file. In general, an inquire is a single file access to retrieve the exact data record in question. PFM does not have this capability. Instead, PFM must search the file to find the desired record.

A direct access inquire implies a unique key (or method) of bringing in the desired record followed by immediate display of the data. Sector number is a unique key in that it identifies exactly the data sector to read from the disk. The only unique key used by PFM is month number, which identifies the beginning sector of a month of data entries.

Therefore, PFM must search for data records according to search criteria. Typically, this criteria includes a range of dates, range of check numbers, budget categories, tax deductible or reconciled flags, and check notation. With this information, PFM may be able to search selected months, or may be forced to search the entire file in order to find the desired entries. Of course, this search is performed sequentially. The only way the search is limited is by specific months.

Once the search is complete, which must be done even to find a specific check, then the results of the search are displayed and may be printed. In addition, the data entries may be edited and updated. Search is usually used to find and display a quantity of information, or find and update a specific entry.

THE DATA PROCESSOR

Most general purpose data base systems provide for specific record inquiry and update via a key which is unique to each record (invoice number, check number, name, etc.) In this fashion, the record key serves as the pointer for finding the specific record with a minimal search, usually reading one data sector. This may be accomplished by a hashing technique where the key converts directly to a data sector address, or by a table of keys which contain the data sector addresses stored with the key (part of the data file, or as a separate index file). Some data files even contain multiple keys, and therefore, multiple index entries for each data record).

As indicated earlier, PFM provides direct access to the data, but sequential searches. PFM does not provide a key to uniquely access each file entry. Nevertheless, the access is probably still faster than what you can do by hand, especially for a file with a large number of entries. Now, on to PFM.DATAFILE Utility, which will do a lot of sequential processing on a direct access file and just a little bit of direct access processing.

PFM.DATAFILE Utility

PFM.DATAFILE Utility is an Applesoft program which uses &OPEN/CLOSE, &READ/WRITE, and &GET/PUT to process PFM.DATAFILE from the Personal Finance Manager package. The primary options menu is:

PFM.DATAFILE	→	SCREEN DISPLAY
PFM.DATAFILE	→	PRINTED REPORT
PFM.DATAFILE	→	TEXT FILE
TEXT FILE	→	PFM. DATAFILE
BUDGET SPENT	→	NEW BUDGET $

When the first option of this menu is chosen, a secondary options menu determines the type of display:

FILE STATUS SUMMARY
MONTHLY SUMMARY
BUDGET SUMMARY
CREDIT SUMMARY
FULL FILE SUMMARY

```
]LIST

10  REM

UTILITY TO PROCESS PFM.DATAFILE
    (C) 1983 BY KEN KASHMAREK

CALL -A.P.P.L.E. : DEC. 1983

20  REM

MO%(12) - CHECKS PER MONTH
MO$(12) - MONTH NAMES
BID$(24) - BUDGET IDS
BU$(24) - BUDGET NAMES
BU(12,24) - BUDGET DOLLARS
SP(12,24) - SPENT DOLLARS

25  REM

CID$(12) - CREDIT IDS
CR$(12) - CREDIT NAMES
CR(12,12) - CREDIT DOLLARS
MS(12) - MONTHLY SPENT
CB - CURRENT BALANCE
DD(12) - MONTHLY DEPOSITS
CH(12) - MONTHLY CHECK TOTALS
CA(12) - MONTHLY CASH TOTALS

30  REM

N% - NEXT CHECK NUMBER
P% - PRINTER SLOT
M% - CURRENT MONTH
D% - CURRENT DAY
TI$ - FILE TITLE

55 F1$ = "     0.00":F2$ = "$
     0.00":F3$ = " $    ,  0.00":Q
     $ =  CHR$ (34)
60 A = 768: & PUT TO A;B(104,168,
     104,166,223,154,72,152,72,96
     ): REM ONERR STACK FIX ROUTI
     NE
65  DIM MO%(12),BID$(24),BU$(24),
     CID$(13),CR$(12),MS(12),SP(1
     2,24),BU(12,24),CR(12,12),DD
     (12),CH(12),CA(12)
70 PX$ = "DATA":TX$ = "TEXT":H$(0
     ) = "SELECT OPTION:":PF$ = "
     PFM.DATAFILE"
75 OE = 0: ONERR  GOTO 1970
90  GOSUB 1800
100 A = 115: &  GET  AT A;A(OH):H
     I = OH - (5120 + 4608): HIMEM:
     HI: DIM MO$(12): FOR I = 0 TO
     12: READ MO$(I): NEXT : DATA
     PRE,JAN,FEB,MAR,APR,MAY,JUN,
     JUL,AUG,SEP,OCT,NOV,DEC:
115 T$ = PX$: GOSUB 1630:FI$ = F$
     :SL = S:DR = D: GOSUB 770
120  PRINT : HTAB 9: INVERSE : PRINT
     "READING BASE DATA AREA": NORMAL

125  & OPEN(FI$,0,1,SL,DR,0): GOSUB
     1100
130  GOSUB 1200
135  GOSUB 1800:H = 0: GOSUB 660
140  GOSUB 1810
150  PRINT "?";: GET OP$: PRINT :
     OP =  VAL (OP$): ON OP ) 7 GOTO
     135: ON OP GOTO 170,625,670,
     780,595,155: & CLOSE(FI$): HIMEM:
     OH: & BELL: PRINT : PRINT "D
     ONE.": END : GOTO 165
155  GOTO 135
165  HIMEM: HI: GOTO 120
170 H = 0: GOSUB 660
175  GOSUB 1820
180  PRINT "?";: GET SD$: PRINT :
     SD =  VAL (SD$): ON SD ) 6 GOTO
     170: POKE 34,2: GOSUB 635: ON
     SD GOTO 190,240,275,320,340:
      GOSUB 645: GOTO 155
185  GOSUB 645: GOTO 170
190 H = SD: GOSUB 655
195  PRINT "FILE NAME =";FI$: PRINT
     : PRINT "FILE TITLE=";Q$;TI$
     ;Q$: PRINT
200  PRINT "NEXT CHECK = ";N%; TAB(
     20);" PRINT SLOT = ";P%: PRINT
     "CUR. MONTH = ";MO$(M%); TAB(
     20);" CURRENT DAY= ";D%
205  PRINT "# OF BUDGETS=";BU%; TAB(
     20);" CREDIT CARDS=";CR%: PRINT
     : PRINT "CURRENT BALANCE = "
     ;: &  PRINT USNG,F3$;CB
```

If the last option from this menu is chosen, then a supplementary menu is displayed:

BUDGET DETAIL
CREDIT DETAIL
CHECK DETAIL
MONTHLY SUMMARY
DETAIL

HIMEM is set to protect the data read in from the file. Under normal conditions, it is reset, when an error is detected. Before using this program, BRUN FILEIO LOADER is necessary to set up the ampersand routines. Also, you should make a copy of your PFM.DATAFILE and use the copy (FID can be used to create the copy, or FILE COPY PROGRAM from part 2 of D Is For Data). Use an empty diskette for this purpose, since PFM.DATAFILE takes 281 sectors and depending on how full your data file is, the DOS formatted text file could take even more space (a 35% utilized PFM.DATAFILE took 111 sectors for the DOS formatted text file).

Some notes about the program are useful. Check line #60. It uses &PUT to establish the ONERR stack fix routine. The arrays are defined at the beginning of the program. The program prompts for filename, slot, and drive for the data file and DOS formatted text file.

PRINT USING & FRIENDS is used to format and print out the dollar amounts. If you do not have PUF from In Depth #1: All About Applesoft (page 85), then you will have to replace occurrences of &PRINT USNG with your own routine or Applesoft code. Two notes of significance. First, the syntax uses a comma (,) in place of ">" to separate "USNG" from the formatting string. Second, &DEL ARRAY also uses a comma to separate the array name from the command and has been modified to delete multiple arrays with one command. This is done by adding code to the end of PUF and branching back to the beginning of the routine if not at then end of the statement (: or zero byte; code added on page 91 of In Depth #1):

```
343 JSR MOVE    (changed from
                 JMP)
344 JSR
    CHRGET      get next character
345 BNE DARY    do next one
346 RTS         at end, return
```

The origin must be reduced to make room for the changes so the resultant module does not overlap $9600. In line #118 on page 88, $CF (token for ">") is removed and the following line is inserted before line #319:

```
319 DARY JSR CHKCOM
    check for comma
320 JSR GETARYPT
    (former line-319)
```

If you cannot update PUF to handle the multiple array delete, then line #1210 in the utility must be changed to multiple commands to delete all of the arrays. It is faster to delete the arrays and redefine them than to set the values to zero with BASIC code. If you have an assembly language routine to clear arrays, this will work just as easily.

```
210 A = 0:B = 0:C = 0:D = 0:N = 0
    : FOR I = 1 TO 12:A = A + MS
    (I):B = B + BU(I,0):C = C +
    SP(I,0):D = D + CR(I,0):N =
    N + MO%(I): NEXT
215 PRINT : PRINT "PRIOR YEAR EN
    TRIES = ";MO%(0): PRINT "CUR
    RENT YEAR ENTRIES = ";N
220 PRINT : PRINT "TOTAL DOLLARS
     SPENT =";: &  PRINT USNG,F3
    $;A
225 PRINT "BUDGET $ ALLOCATED  =
    ";: &  PRINT USNG,F3$;B: PRINT
    "BUDGET $ SPENT       =";: &
     PRINT USNG,F3$;C
230 PRINT "CREDIT CARD $ SPENT =
    ";: &  PRINT USNG,F3$;D
235 GOSUB 1140: GOTO 185
240 H = SD: GOSUB 655
245 PRINT "MON   #      MAX   USED
        SPENT": PRINT :C = 0:D =
    0
255 FOR I = 1 TO 12: PRINT MO$(I
    );" ";: &  PRINT USNG,"   ";
    MO%(I);: PRINT  TAB( 10);"/
    ";C%; TAB( 18); INT (MO%(I)
    * 100 / C%);"%"; TAB( 24);:
    &  PRINT USNG,F3$;MS(I)
260 C = C + MO%(I):D = D + MS(I):
    NEXT : PRINT
265 HTAB 5: PRINT C; TAB( 10);"/
    ";C% * 12; TAB( 18); INT (C
    * 100 / (C% * 12));"%"; TAB(
    24);: &  PRINT USNG,F3$;D
270 GOSUB 1140: GOTO 185
275 H = SD: GOSUB 655
280 PRINT "     ID     BUDGET CATE
    GORY": PRINT :Z = BU%: IF BU
    % > 12 THEN Z = 12
290 FOR I = 1 TO Z: PRINT I; TAB(
    5);BID$(I);"  ";Q$;BU$(I); TAB(
    30);Q$: NEXT : GOSUB 1140: IF
    BU% < 13 GOTO 315
300 VTAB 7: HTAB 1: &  CLEAR  TO
    EOP: FOR I = 13 TO BU%: PRINT
    I; TAB( 5);BID$(I);"  ";Q$;B
    U$(I); TAB( 30);Q$: NEXT : GOSUB
    1140
315 GOSUB 1710: GOSUB 1140: GOTO
    185
320 H = SD: GOSUB 655
325 PRINT "ID     CREDIT CARD"; TAB(
    30);"SPENT": PRINT
330 FOR I = 1 TO CR%: PRINT CID$
    (I);" ";Q$;CR$(I); TAB( 25);
    Q$;" ";: &  PRINT USNG,F3$;C
    R(0,I): NEXT
335 GOSUB 1140: GOTO 185
340 GOSUB 645:H = 0: GOSUB 660
345 GOSUB 1830
350 PRINT "?";: GET SD$: PRINT :
    SD =  VAL (SD$): ON SD > 5 GOTO
    340: GOSUB 635: ON SD GOTO 4
    35,480,505,360: GOSUB 645: GOTO
    185
355 GOSUB 645: GOTO 340
360 H = SD: GOSUB 655: PRINT "MON
      FC   #DEP #CHK   DEPOSIT
       CASH": PRINT
365 MP = HI + 4608:ME = HI:D1 = 0
    :C1 = 0:M1 = 0:N1 = 0:L1 = 0
    :E1 = 0
370 FOR I = 1 TO 12:D = 0:C = 0:
    M = 0:N = 0:FC = 0:L = 0:E =
    0: ON MO%(I) = 0 GOTO 405:MO
     = I: GOSUB 1160:XE = MP + 2
    5
375 FOR J = 1 TO MO%(I): IF  INT
    (J / 10) = J / 10 THEN XE =
    XE + 6
380 &  GET  AT XE;R(XX);%(N%):XE
     = XE + 18: IF FC = 0 AND N%
    > 0 THEN FC = N%
385 IF N% = 0 THEN E = E + XX:L =
    L + 1
390 IF N% > 0 THEN C = C + XX:M = M + 1
```

THE DATA PROCESSOR

The program uses ONERR extensively for error conditions. ONERR information is stacked for nested calls (line #1920) and unstacked when processing is complete (line #1940). Applesoft keeps error handling information at locations $F4–$F7 (244–247) as well as locations 216 (high bit), 222 (error number), and 218 (line number). If an error occurs, PFM.DATAFILE is closed, HIMEM is reset, and the program terminates (if a DOS text file is open, it is not closed).

&BELL and &CLEAR TO EOP from PUF are also used. Slot and Drive are checked when file conversion is being performed. If the data file and text file are on the same disk, the prompts for inserting diskettes can be bypassed by entering 0 (zero) as slot and drive values for both files.

Check entries are read in lines 535 and 740 while check entries are written in line #840. The subroutine at line #1100 reads the base data area from the file while the subroutine at line #1200 formats the data for Applesoft. The base data area is created at line #1430 and written to the file at line #1120.

The only data updating function is BUDGET SPENT → NEW BUDGET $. This can be used prior to PFM year end processing to map the current year expenditures into next years budget dollars. This will save time when initializing the file and entering new budgets. When PFM performs year end processing, it does not clear the data sectors back to zeros. PFM.DATAFILE Utility does clear the empty data sectors to zeros when the file is converted to and from a DOS formatted text file.

```
395  IF N% =  - 13 THEN D = D + X
     X:N = N + 1
400  NEXT J:D1 = D1 + D:C1 = C1 +
     C:M1 = M1 + M:N1 = N1 + N:L1
      = L1 + L:E1 = E1 + E:DD(I) =
     D:CH(I) = C:CA(I) = E
405  PRINT MO$(I);: &  PRINT USNG
     ,"     ";FC,N,M:: PRINT "
     ";: &  PRINT USNG,F1$;D;: PRINT
     " ";: &  PRINT USNG,F1$;E
410  NEXT I: PRINT : PRINT "
       ";: &  PRINT USNG,"      "
     ;N1,M1;: PRINT "   ";: &  PRINT
     USNG,F1$;D1;: PRINT " ";: &
      PRINT USNG,F1$;E1
415 BB = CB - D1 + C1: PRINT : PRINT
     "BEGINING BALANCE=";: &  PRINT
     USNG,F3$;BB: PRINT "ENDING B
     ALANCE  =";: &  PRINT USNG,F
     3$;CB: GOSUB 1140
420 HEAD$ = "MON  BEGINNING   DEP
     OSIT     SPENT": GOSUB 665:B
     E = BB: FOR I = 1 TO 12: PRINT
     MO$(I);: &  PRINT USNG," $
     ,   .00";BE,DD(I),CH(I):BE =
     BE + DD(I) - CH(I): NEXT : GOSUB
     1140
425 HEAD$ = "MON   SPENT = CHECKS
      + CREDIT +   CASH": GOSUB 6
     65: FOR I = 1 TO 12: PRINT M
     O$(I);: &  PRINT USNG,"
     0.00";MS(I),CH(I) - CR(0,I),
     CR(0,I),CA(I): NEXT : GOSUB 1140
430  GOTO 355
435 H = SD: GOSUB 655: PRINT "
      SPENT   BUDGETED": PRINT
445  FOR I = 1 TO 12: PRINT  TAB(
     5)"****** ";MO$(I);" ******
     ";: &  PRINT USNG,F2$;MS(I):
      PRINT : FOR J = 1 TO BU%
450 XX = SP(I,J):XY = BU(I,J)
460  PRINT BID$(J);: &  PRINT USN
     G,F3$;XX,XY;:
465  IF XY > 0 THEN  PRINT  TAB(
     28);: &  PRINT USNG,"   "; INT
     (XX * 100 / XY);: PRINT "%";

470  PRINT : NEXT : PRINT : NEXT

475  GOSUB 1140: GOTO 355
480 H = SD: GOSUB 655
485  FOR I = 1 TO 12: PRINT  TAB(
     1)"****** ";MO$(I);" ******"
     : PRINT : FOR J = 1 TO CR%
490  PRINT CID$(J);: &  PRINT USN
     G,F3$;CR(I,J): NEXT : PRINT
     : NEXT : PRINT
500  GOSUB 1140: GOTO 355
505 H = SD: GOSUB 655
510 MP = HI + 4608:ME = HI: FOR I
     = 0 TO 12
515  PRINT : PRINT "******** ";MO
     $(I);" (";MO%(I);") ********
     ";: &  PRINT USNG,F2$;MS(I)
     : PRINT : IF MO%(I) = 0 THEN
     585
520 MO = I: GOSUB 1160:XE = MP +
     25
530  FOR C = 1 TO MO%(I): IF  INT
     (C / 10) = C / 10 THEN XE =
     XE + 6
535  &  GET  AT XE;R(XX);%(C%);B(
     MO,DA);C2(AC$);C14(ID$)
540 DE$ = " ": IF MO > 127 THEN D
     E$ = "*":MO = MO - 128
545 RE$ = " ": IF DA > 127 THEN R
     E$ = ":":DA = DA - 128
550  IF C% > 0 THEN  PRINT C%;: GOTO
     560
555 C% =  ABS (C%): PRINT CID$(C%
     );
560  PRINT  TAB( 5);RE$;MO$(MO);"
     /";: &  PRINT USNG,"  ";DA;
565  PRINT  TAB( 13);ID$;: &  PRINT
     USNG,F1$;XX;: PRINT " ";;DE$
     ;" ";AC$
580  NEXT C
585  NEXT I
590  GOSUB 1140: GOTO 355
595  REM BUDGET SPENT -> NEW BUDG
     ET $
600 H = OP: GOSUB 655
605  FOR I = 1 TO 12: FOR J = 1 TO
     BU%:BU(I,J) = SP(I,J): NEXT
     : NEXT : GOSUB 1430: GOSUB 1
     200: GOSUB 1710
610  INPUT "OKAY TO WRITE BACK (Y
     /N)? ";A$: IF A$ <  > "Y" THEN
      PRINT "BYPASSED": GOTO 620
615  GOSUB 1120
620  GOSUB 1140: GOTO 155
625  REM TURN PRINT OPTION ON/OFF

630 H = OP: GOSUB 660: & BELL: PRINT
     : INPUT "PR# ";PR: GOTO 155
635  IF PR THEN  PRINT  CHR$ (4);
     "PR# ";PR
640  RETURN
```

This program makes no attempt to provide every possible option for processing PFM.DATAFILE. In combination with the assembly language routines, it provides a base for processing the data in PFM.DATAFILE. This is the problem I set out to solve when I began writing these program. I wanted to get my data from PFM.DATAFILE over to another data management system or a spreadsheet program without manual data entry. It should be fairly straight forward to modify the Applesoft program to convert the data file to any other format, either a standard DOS file, or other file type and format using the new ampersand routines.

Summary

Going back to part 1 of D Is For Data, the objective of this series was to explore data storage and retrieval techniques. In particular, we have introduced accessing and storing binary data items on disk files. Personal Finance Manager used a text file for this purpose, but I would recommend using the "S" file instead. There is no defined use for "S" files, and this is a reasonable purpose.

PFM.DATAFILE was an ideal collection of data for the programs developed in this series. It provided the groundwork for a set of file oriented access routines and memory to memory data manipulation routines. PFM is not unique in this sense. Most data base and data management routines store data in the internal binary formats necessary for efficient processing (speed and disk space).

In addition to binary data formats on disk, we have covered some general data processing concepts including sequential and direct access of files, data entry retrieval, search, update, and reporting. Personal Finance Manager provides all of these capabilities, while PFM.DATAFILE Utility provides some alternate data reporting and file conversion options. Obviously, there is more to processing data than just opening a file and writing information to it. A good data base system requires a well designed file layout and programs to process the data.

```
645  IF PR THEN  PRINT  CHR$ (4);
     "PR# 0"
650  RETURN
655  VTAB 2: HTAB 1: &  CLEAR  TO
     EOP: PRINT : HTAB (40 -  LEN
     (H$(H))) / 2: INVERSE : PRINT
     H$(H): NORMAL : PRINT : RETURN

660  VTAB 2: HTAB 1: &  CLEAR  TO
     EOP: PRINT : HTAB 3: PRINT H
     $(H): PRINT : & BELL: RETURN

665  VTAB 2: HTAB 1: &  CLEAR  TO
     EOP: PRINT : PRINT HEAD$: PRINT
     : RETURN
670  REM PFM.DATAFILE -> TEXT FIL
     E
675 H = OP: GOSUB 655:T$ = TX$: GOSUB
     1630:TF$ = F$:TS = S:TD = D:
      GOSUB 1920: ONERR  GOTO 206
     0
680  GOSUB 775: & OPEN(TF$,0,0,TS
     ,TD,0): & CLOSE(TF$):D$ =  CHR$
     (4): PRINT D$;"OPEN";TF$;
682  IF TS > 0 AND TD > 0 THEN  PRINT
     ",S";TS;",D";TD;
685  PRINT : PRINT D$;"WRITE";TF$
     : FOR I = 0 TO 12: PRINT MO%
     (I): NEXT
690  PRINT N%","P%","C%","X1%","M
     %","D%","X2%","X3%","X4%","X
     5%","X6%","Q$;TI$;Q$;",";CB:
      FOR I = 1 TO 12: PRINT MS(I
     ): NEXT
695  PRINT BU%: FOR J = 1 TO BU%:
      PRINT Q$;BID$(J);Q$;",";Q$;
     BU$(J);Q$
705  FOR I = 1 TO 12: PRINT BU(I,
     J);",";SP(I,J): NEXT : NEXT

710  PRINT CR%: FOR J = 1 TO CR%:
      PRINT Q$;CID$(J);Q$;",";Q$;
     CR$(J);Q$
720  FOR I = 1 TO 12: PRINT CR(I,
     J): NEXT : NEXT : PRINT D$
725 MP = HI + 4608: FOR I = 0 TO
     12: VTAB 8: HTAB 1: &  CLEAR
      TO EOP: PRINT : PRINT "WORK
     ING ON MONTH OF ";MO$(I);",
     ENTRIES=";MO%(I): ON MO%(I) =
     0 GOTO 750
730  GOSUB 770:MO = I: GOSUB 1160
     :XE = MP + 25: GOSUB 775: PRINT
     D$;"WRITE";TF$
735  FOR C = 1 TO MO%(I): IF  INT
     (C / 10) = C / 10 THEN XE = XE + 6

740  &  GET  AT XE;R(XX);%(N%);B(
     MO,DA);$16(TAG$): PRINT XX",
     "N%","MO","DA",";Q$;TAG$;Q$:
      NEXT C: PRINT D$
750  NEXT I
760  PRINT D$;"CLOSE";TF$: GOSUB
     1940: PRINT : PRINT "FINISHE
     D CREATING ";TF$:TF$ = ""
765  GOSUB 770: GOTO 155
770  IF ((SL = 0 AND DR = 0) OR (
     SL <  > TS OR DR <  > TD)) AND
     (TF$ <  > "") THEN  RETURN
772  & BELL: & BELL: PRINT : PRINT
     "INSERT ";: INVERSE : PRINT
     FI$;: NORMAL : PRINT " IN S=
     ";SL;", D=";DR: GOSUB 1140:: RETURN
775  IF (TS = 0 AND TD = 0) OR (S
     L <  > TS OR DR <  > TD) THEN RETURN
777  & BELL: PRINT : PRINT "INSER
     T ";: FLASH : PRINT TF$;: NORMAL
     : PRINT " IN S=";TS;", D=";T
     D: GOSUB 1140: RETURN
780  REM TEXTFILE -> PFM.DATAFILE

785  & CLOSE(FI$):H = OP: GOSUB 6
     55:T$ = TX$: GOSUB 1630:TF$ =
     F$:TS = S:TD = D: GOSUB 1920
     : ONERR  GOTO 2060
790  GOSUB 775: & OPEN(TF$,0,1,TS
     ,TD,0): & CLOSE(TF$):D$ =  CHR$
     (4): PRINT D$;"OPEN";TF$;
792  IF TS > 0 AND TD > 0 THEN  PRINT
     ",S";TS;",D";TD;
795  PRINT : PRINT D$;"READ";TF$:
      FOR I = 0 TO 12: INPUT MO%(
     I): NEXT I
800  INPUT N%,P%,C%,X1%,M%,D%,X2%
     ,X3%,X4%,X5%,X6%,TI$,CB: FOR
     I = 1 TO 12: INPUT MS(I): NEXT I
```

THE DATA PROCESSOR

D Is For Data achieved the objective I set in attempting to convert PFM.DATAFILE to a different file format. In addition, we have gained some insight into how similar programs process data. For systems implemented in assembly language, the ampersand routines are not necessary, but the file handling and data management concepts are the same. We have all been tortured by the slowness of FILE CABINET. It comes with the turf when using DOS formatted text files. The performance of routines such as FILE CABINET can be improved significantly by converting the files from DOS formatted text files to binary formatted data files and designing an efficient layout for the file to improve data handling.

Post Script on D Is For Data

This topic does not end here. It continues on in the minds and imaginations of the readers. We have been writing about Applesoft and DOS for years because there is always something new and better coming along each month. This series only scratches the surface of file access and data handling. A four part series hardly does justice to the topic.

```
810  INPUT BU%: FOR J = 1 TO BU%:
      INPUT BID$(J),BU$(J): FOR I
     = 1 TO 12: INPUT BU(I,J),SP
     (I,J): NEXT I: NEXT J
815  INPUT CR%: FOR J = 1 TO CR%:
      INPUT CID$(J),CR$(J): FOR I
     = 1 TO 12: INPUT CR(I,J): NEXT
     I: NEXT J: PRINT D$
820  GOSUB 1430:T$ = PX$: GOSUB 1
     630:FI$ = F$:SL = S:DR = D: GOSUB
     770: & OPEN(FI$,0,0,SL,DR,0)
     : GOSUB 1120
825 MP = HI + 4608: FOR I = 0 TO
     12:XE = MP: & PUT TO XE;B(14
     1);%(0,0);R(0,0,0,0): VTAB 8
     : HTAB 1: &  CLEAR  TO EOP: PRINT
     : PRINT "WORKING ON MONTH OF
      ";MO$(I);", ENTRIES=";MO%(I
     ): ON MO%(I) = 0 GOTO 845
830  GOSUB 775: PRINT D$;"READ";TF$
835  FOR C = 1 TO MO%(I): IF  INT
     (C / 10) = C / 10 THEN  & PU
     T TO XE;%(0,0,0)
840  INPUT XX,N%,MO,DA,TAG$: & PU
     T TO XE;R(XX);%(N%);B(MO,DA)
     ;C16(TAG$): NEXT C: PRINT D$
     : GOSUB 770
845  ON MO%(I) = 199 GOTO 855: FOR
     C = MO%(I) + 1 TO 199: IF  INT
     (C / 10) = C / 10 THEN  & PU
     T TO XE;%(0,0,0)
850  & PUT TO XE;R(0,0,0,0,0): NEXT
     C
855 MO = I: GOSUB 1180
860  NEXT I
865  PRINT D$;"CLOSE";TF$: GOSUB
     1940: PRINT "FINISHED WITH "
     ;TF$:TF$ = ""
870  & CLOSE(FI$): GOTO 120
1000  REM INPUT SUBROUTINE
1010  GOSUB 1920: ONERR  GOTO 204
     0
1020  &  READ (FI$,R,XE): GOSUB 1
     940: RETURN
1060  REM OUTPUT SUBROUTINE
1070  GOSUB 1920: ONERR  GOTO 204
     0
1080  & WRITE(FI$,R,XE): GOSUB 19
     40: RETURN
1100  REM INPUT BASE DATA AREA
1110 XE = HI: FOR R = 0 TO 17: GOSUB
     1000:XE = XE + 256: NEXT R: RETURN
1120  REM OUTPUT BASE DATA AREA
1130 XE = HI: FOR R = 0 TO 17: GOSUB
     1060:XE = XE + 256: NEXT R: RETURN
1140  GOSUB 645: PRINT : PRINT "H
     IT ANY KEY TO PROCEED ";: GET
     A$: PRINT :A =  ASC (A$): IF
     A <  > 3 AND A <  > 27 THEN
      GOSUB 635: RETURN
1150  & CLOSE(FI$): HIMEM: OH: END
     : GOTO 165
1160  REM INPUT A MONTH OF DATA
1170 SE = 18 + MO * 20:XE = MP: FOR
     R = SE TO SE +  INT (MO%(I) /
     10): GOSUB 1000:XE = XE + 25
     6: NEXT R: RETURN
1180  REM OUTPUT A MONTH OF DATA
1190 SE = 18 + MO * 20:XE = MP: FOR
     R = SE TO SE + 19: GOSUB 106
     0:XE = XE + 256: NEXT R: RETURN

1200  REM GET BASE AREA DATA
1210  &  DEL ARRAY,CR,BU,SP,MS,CR
     $,CID$,BU$,BID$,MO%
1220  DIM MO%(12),BID$(24),BU$(24
     ),CID$(13),CR$(12),MS(12),SP
     (12,24),BU(12,24),CR(12,12)
1230  PRINT : HTAB 12: INVERSE : PRINT
     "SUMMARIZING DATA": HTAB 12:
      PRINT "  PLEASE WAIT  ": NORMAL

1240  REM CHECKS PER MONTH
1250 ME = HI: FOR I = 0 TO 12: &
      GET  AT ME;%(MO%(I)): NEXT

1260  REM SOME KEY VARIABLES
1270  &  GET  AT ME;%(N%,P%,C%,X1
     %,M%,D%,X2%,X3%,X4%,X5%,X6%)
     ;$22(TI$);%(X)
1280  REM BUDGET ID AND NAME
1290 BU% = 0: FOR I = 1 TO 24: &
      GET  AT ME;$2(BID$(I));$20(
     BU$(I));%(X): IF BID$(I) <  >
     "" THEN BU% = I
1300  NEXT
1310  REM CREDIT CARD ID AND NAME

1320 CR% = 0: FOR I = 1 TO 12: &
      GET  AT ME;$2(CID$(I));$20(
     CR$(I));%(X): IF CID$(I) <  >
     "" THEN CR% = I
1330  NEXT : &  GET  AT ME;R(CB):
      REM $ BALANCE
1340  REM GET BUDGET $ AND SPENT $

1350 LY = HI + 1001:LZ = HI + 244
     1:LO = HI + 3881:M = 5 * (24
      - BU%):N = 5 * (12 - CR%)
1360  REM FIRST, MONTHLY SPENT $
1370  FOR I = 1 TO 12: &  GET  AT
     ME;R(MS(I)):S = 0:B = 0
1380  FOR J = 1 TO BU%: &  GET  AT
     LY;R(X): &  GET  AT LZ;R(Y)
1390 SP(0,J) = SP(0,J) + X:BU(0,J
     ) = BU(0,J) + Y:SP(I,J) = X:
     BU(I,J) = Y
1400 S = S + X:B = B + Y: NEXT J:
     SP(I,0) = S:BU(I,0) = B:S =
     0:LY = LY + M:LZ = LZ + M
```

A key point to this series is that disk data files should be treated differently than the "pseudo" keyboard input or screen output technique embodied in DOS formatted text files. There is nothing wrong with DOS text files. They simply are not suitable for handling large volumes of data or efficient processing. A program can exercise greater control over disk files by using the file manager directly in place of going through the DOS [Ctrl-D] intercepts. In addition, the data can be processed more efficiently by using the ampersand routine for &GET/PUT. With assist from these assembly language routines, a successful data base system can easily be implemented in Applesoft and be nearly as efficient as some assembly language implementations. In any case, if you wanted to learn about DOS and the file manager, this series gave it to you.

&GET/PUT can be extended by additional formats for handling data. For example, T for fast handling of DOS formatted text files (directly to and from string variables), and a format for handling arrays without writing Applesoft program loops. How about a special format for storing and retrieving compressed High-Res graphics pages (G). Yes, all of this takes memory, but for those of you with a language card or memory expansion cards, it should not be to hard to move these routines, and use the expanded memory for the ampersand routines, as well as data buffers and index buffers for keyed direct access data files. In fact, the alternate 4K page at $D000 in the language card is just about perfect for this. The *IIe* provides almost an entire 64K for this purpose, leaving the original 36K of memory for Applesoft programs, High-Res pages, and strings.

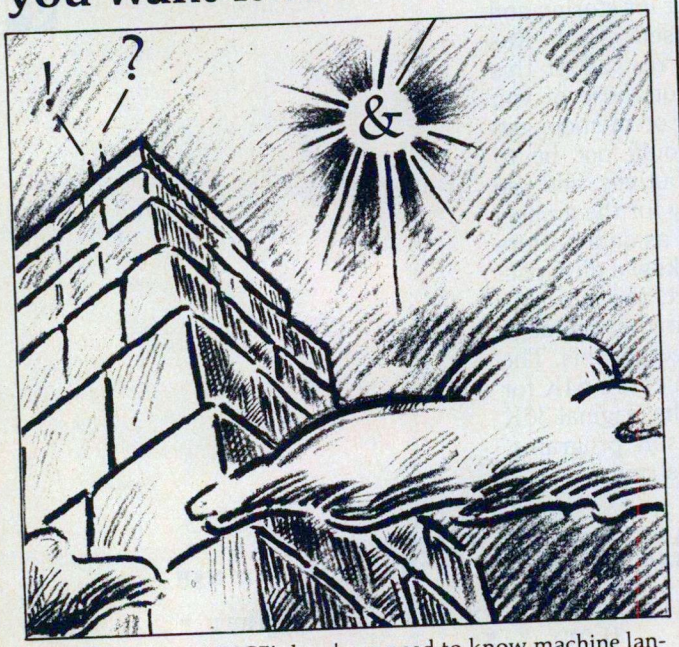
The world of data is as exciting and fascinating as the world of programming. If you thought programming was a challenge, data base design is even more so. I hope it is as exciting for you as it is for me.

```
1410  FOR J = 1 TO CR%: &  GET  AT
      LO;R(X):CR(0,J) = CR(0,J) +
      X:S = S + X:CR(I,J) = X: NEXT
      J:CR(I,0) = S:LO = LO + N
1420  NEXT I:CID$(0) = "CASH":CID
      $(13) = "DEP ": RETURN
1430  REM PUT BASE AREA DATA
1440  REM CHECKS PER MONTH
1450 ME = HI: FOR I = 0 TO 12: &
      PUT TO ME;%(MO%(I)): NEXT
1460  REM SOME KEY VARIABLES
1470  & PUT TO ME;%(N%,P%,C%,X1%,
      M%,D%,X2%,X3%,X4%,X5%,X6%);$
      22(TI$);%(0)
1480  REM BUDGET ID AND NAME
1490  FOR I = 1 TO BU%: & PUT TO
      ME;C2(BID$(I));C20(BU$(I));%
      (0): NEXT : IF BU% < 24 THEN
       FOR I = BU% + 1 TO 24: & PU
      T TO ME;C22("");%(0): NEXT
1510  REM CREDIT CARD ID AND NAME

1520  FOR I = 1 TO CR%: & PUT TO
      ME;C2(CID$(I));C20(CR$(I));%
      (0): NEXT : IF CR% < 12 THEN
       FOR I = CR% + 1 TO 12: & PU
      T TO ME;C22("");%(0): NEXT
1540  & PUT TO ME;R(CB): REM $ BA
      LANCE
1550  REM PUT BUDGET $ AND SPENT
      $
1560 LY = HI + 1001:LZ = HI + 244
      1:LO = HI + 3881
1570  REM FIRST, MONTHLY SPENT $
1580  FOR I = 1 TO 12: & PUT TO M
      E;R(MS(I))
1590  FOR J = 1 TO BU%: & PUT TO
      LY;R(SP(I,J)): & PUT TO LZ;R
      (BU(I,J)): NEXT J
1600  IF BU% < 24 THEN  FOR J = B
      U% + 1 TO 24: & PUT TO LY;R(
      0): & PUT TO LZ;R(0): NEXT J

1610  FOR J = 1 TO CR%: & PUT TO
      LO;R(CR(I,J)): NEXT : IF CR%
       < 12 THEN  FOR J = CR% + 1 TO
      12: & PUT TO LO;R(0): NEXT
1620  NEXT I: RETURN
1630  REM GET FILE NAME
1640  PRINT T$;: INPUT " FILE NAM
      E: ";F$
1650  HTAB  LEN (T$) + 7: INPUT "
      SLOT: ";S
1660  HTAB  LEN (T$) + 6: INPUT "
      DRIVE: ";D: RETURN
1710  REM BUDGET DISPLAY
1720  VTAB 4: HTAB 1: &  CLEAR  TO
      EOP: PRINT : PRINT "ID BUDGE
      T   SPENT"; TAB( 21);"ID BUD
      GET   SPENT": PRINT
1730  FOR J = 1 TO BU% STEP 2: PRINT
      BID$(J);: &  PRINT USNG,F1$;
      BU(0,J);: PRINT  TAB( 12);: &
       PRINT USNG,F1$;SP(0,J);: PRINT
       TAB( 21);BID$(J + 1);: &  PRINT
      USNG,F1$;BU(0,J + 1);: PRINT
       TAB( 32);: &  PRINT USNG,F1
      $;SP(0,J + 1): NEXT
1740  RETURN
1800  TEXT : HOME : HTAB 10: INVERSE
      : PRINT PF$;" UTILITY": NORMAL
      : PRINT : RETURN
1810 H$(1) = PF$ + " -> SCREEN DI
      SPLAY":H$(2) = PF$ + " -> PR
      INTED REPORT":H$(3) = PF$ +
      " -> TEXT FILE":H$(4) = "TEX
      T FILE    -> " + PF$:H$(5) =
      "BUDGET SPENT -> NEW BUDGET
      $":H$(6) = "---------- ->
      ----------":H$(7) = "FINIS
      H":T = 7: GOTO 1840
1820 H$(1) = "FILE STATUS SUMMARY
      ":H$(2) = "MONTHLY SUMMARY":
      H$(3) = "BUDGET SUMMARY":H$(
      4) = "CREDIT SUMMARY":H$(5) =
      "FULL FILE SUMMARY":H$(6) =
      "RETURN TO MAIN MENU":T = 6:
       GOTO 1840
1830 H$(1) = "BUDGET DETAIL":H$(2
      ) = "CREDIT DETAIL":H$(3) =
      "CHECK DETAIL":H$(4) = "MONT
      HLY SUMMARY DETAIL":H$(5) =
      "RETURN":T = 5
1840  FOR I = 1 TO T: HTAB 5: PRINT
      I;" - ";H$(I): NEXT : PRINT
      : RETURN
```

Trapped by the language? They found out in Babel what happens when your language won't do what you want it to.



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DEALERS INVITED

Circle 3 on Reader Service Card

DATA PROCESSOR

```
1900  REM ERROR HANDLING ROUTINES

1910  REM SAVE CURRENT ONERR POIN
      TERS
1920  A = 244: &  GET  AT A;A(OT(O
      E),OL(OE)):OE = OE + 1: RETURN

1930  REM RESTORE OLD ONERR POINT
      ERS
1940  OE = OE - 1:A = 244: & PUT TO
      A;A(OT(OE),OL(OE)): RETURN
1970  REM FIRST LEVEL ERROR HANDL
      ER
1980   POKE 216,0:A = 218: &  GET
       AT A;A(LI):ER =  PEEK (222)
      : CALL 768: & BELL: PRINT
1990   IF ER = 254 THEN  PRINT "BA
      D INPUT";: GOTO 2020
2000   IF ER = 255 THEN  PRINT "BR
      EAK";: GOTO 2020
2010   ON ER > 0 AND ER < 17 GOTO
       2050: PRINT "ERROR CODE=";ER
       ;
2020   PRINT " IN LINE ";LI: GOTO
       2090
2040   REM DATAFILE ERROR HANDLER
2050   POKE 216,0: CALL 768: PRINT
      : PRINT "ERROR IN ";PX$: GOTO
       2075
2060   REM TEXTFILE ERROR HANDLER
2070   POKE 216,0: CALL 768: PRINT
      : PRINT "ERROR IN ";TX$
2075  X = 43377 +  PEEK (43583 +  PEEK
      (222)): PRINT : HTAB 5: & BE
      LL: PRINT "--> ";
2080  Y =  PEEK (X): PRINT  CHR$ (
      Y);:X = X + 1: ON Y < 128 GOTO
       2080: PRINT : PRINT
2090   PRINT  CHR$ (4);"CLOSE": HIMEM:
       OH: END
```

```
]LIST

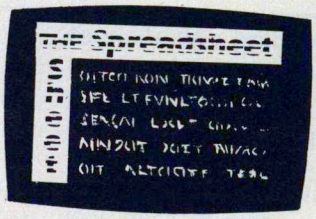
0  REM * SO WHAT DID YOU EXPECT *

        NOT RETURN AFTER GOSUB
              RUSS BOGUE
           CALL -A.P.P.L.E.
                 *
10  HOME : TEXT : VTAB (23)
20  PRINT "CONVERT HEX:  $FF="
30  POKE 32,20: POKE 33,4: PRINT

40  J =  NOT (J OR  NOT  NOT J)
50   ON  NOT J AND J OR J GOTO 70
60  ::::::::: RETURN :::::::::
70  ::::::::: GOSUB 250:::::::::
80   IF  INT (I / 220) THEN 70
90   GOTO 40
250  REM          *
               SUBROUTINE
                 *
255  I = I +  NOT (J AND  NOT J)
260   PRINT I
265   GOTO 40
```

THE SPREADSHEET SHEET:

Data Analysis (Part 1)



Jeffrey Jacques, Ph.D.

Introduction

THIS is the first article of a ten part series on how to use *THE Spreadsheet* for data analyses. In this series we will examine how you may use this software for exploring, describing and explaining data and data relationships from the natural, social or behavioral sciences, or the world of business.

We might point out that most articles and books on statistical applications and electronic spreadsheets are quick to emphasize the advantages of this type of software for easy data entry, cleaning, and simple analysis — e.g., finding the minimum, maximum and average values. Unfortunately, these same books and articles argue that there are severe limitations of this type of software when you wish to perform more sophisticated analyses. Authors of these articles typically suggest creating a DIF™ file and writing a BASIC program to perform the slightly more complex and sophisticated analyses (see Hergert, 1983).

It has seemed to me that if I spend a considerable amount of money on a good electronic spreadsheet program and a good bit of my time learning the commands, structure and functions of this program, then with a little forethought, I should be able to use it directly for much of my work. By creating several essential templates on my Apple, I should be able to simply insert the necessary rows and columns, substitute current data, modify a few cells, and easily recompute/perform appropriate statistical analyses. Well, if you think as I do, then read on.

In this first article, we will explore how you can use THE Spreadsheet to do what any good analyst would wish to do with his/her data; statistically summarize each variable of the study in terms of the mean, range, standard deviation, skewness and other statistics. In the second article, we will explore how to create simple and grouped frequency distributions, and bar graphs. Contingency table analysis or crosstabulations — a way to summarize the joint distribution of two or more variables at a time— will be the topic of the third article. The fourth article will be devoted to computing summary bivariate statistics from these crosstabulations. In the fifth article, we shall emphasize bivariate regression techniques and ancillary statistics. In the sixth through ninth articles we shall explore how to create templates for the most often used inferential statistical procedures. We'll use the final article to examine multiple regression analysis and to pull together some thoughts on using THE Spreadsheet and data analysis. All these statistical and analytic techniques are possible, with a little forethought and the construction of efficient templates, without having to create a DIF™ file or write a BASIC program.

Good data analyses for typical data sets (where there are < 10 variables and 100 cases) do not require a Cyber 760, IBM 370, or Univac 1100. Nor do they require specialized statistical packages such as *SPSS, BMD,* or *SAS.* All you need is your Apple and THE Spreadsheet.

I will begin with the assumptions that you have had only minimal exposure to basic statistics. If you have had no exposure to statistical procedures, don't worry. In fact, you may be better off than some who have gotten caught in the quagmire of calculator computational routines which have no intrinsic meaning. Here we will emphasize and use conceptually meaningful formulae which support the definitions of the procedures under study.

I will assume, however, that you have access to a copy of THE Spreadsheet. Similar to the last template we constructed, I will assume that you have mastered how to: (1) load the program, (2) move the cursor and enter data, labels and some formulae, (3) load and save your worksheet, and (4) use some spreadsheet functions. The functions we will use in the construction of this first template are:

1. @MIN
2. @MAX
3. @SUM
4. @COUNT
5. @AVE
6. @INT
7. @SQRT

If you have been following our series, then you probably recognize these functions. If you do not recognize some of these commands, then take a slight detour to your documentation.

—◉→

business

DATA ANALYSIS (PART 1)

Building a Worksheet for Data Analysis

Before you dart off to load THE Spreadsheet, take a few minutes and think about the nature of your data and the kinds of descriptive statistics you wish to have about each of the variables. For each variable, I generally find the following descriptive statistics: (1) the number of valid entries; (2) the minimum, (3) maximum and (4) range of values; (5) the sum of all values; (6) the mean value; (7) the spread of scores about the mean — variance and (8) standard deviation; and the degree to which each distribution departs from the normal distribution — (9) skewness and (10) kurtosis.

To help master how to use THE Spreadsheet for the analysis of data, I have enclosed a data set which we may use to test our worksheets and templates and serve as the basis for our discussions. Before we examine these data and the construction of the first template, it is useful to review the codebook — i.e., a listing of variable names, variable labels and value labels — where appropriate. I have chosen a set of variables which has had some interest to many of us and has had considerable play in the media — the issues of salary sex equity among faculty. I have included some of the variables which are likely to be important in developing such a study. See Table 1.1. Further, the data set used here may be considered a random sample and includes a total of twenty cases. (Knowing that this is a random sample may not be important now, but it will become so when we consider inferential statistical procedures.) Our data matrix, therefore, will be 20 rows by six columns — five variables and a faculty identifier.

Keeping track of these individual data elements may be of some interest to those looking for an efficient data base management system for small data sets. But for me, the summary statistics and variable relationships are of greater interest. THE Spreadsheet provides an impressive array of functions which easily tabulate several descriptive statistics. Further, with a little imagination, we can use some of these same functions to help compute the more sophisticated statistics. But first, let's examine how to use these standard functions:

1) @COUNT or how many valid entries exist for that variable,
2) @MINimum or the lowest value for that variable,
3) @MAXimum or the highest value for that variable,
4) @SUMmation of all the values for that variable, and
5) @AVErage or the variable mean.

Take a minute and enter, in column A, a list of these summary statistics on your worksheet. Go ahead, follow Table 1.2 and enter the faculty identifier and summary labels. I'll wait... Check and make sure that each summary statistic is on the same row as I have listed. We'll be using several of these row cells to help us compute the additional statistics, so please take your time and check your worksheet.

TABLE 1.1

CODEBOOK FOR FACULTY SURVEY

Variable Number	Variable Name	Variable Label	Value	Value Label	Missing Value
1	Rank	Faculty Rank	1	Instructor	Blank
			2	Assistant Prof	
			3	Associate Prof	
			4	Full Prof	
2	Degree	Highest Degree Earned	1	Bachelor	Blank
			2	Masters	
			3	Doctorate	
3	Income	Nine Months Salary	Variable		Blank
4	Yrsemp	Number of Yrs. Employed	Variable		Blank
5	Sex	Employee Sex Code	0	Female	Blank
			1	Male	

Using the Available Functions

Elsewhere we have noted how to invoke these available functions. We will, therefore, only briefly review them here. Before going too far, make sure that you have changed the Recalculation Mode to Manual rather than Automatic. This will allow easier entry of your formulae by reducing the amount of time you have to wait between entries.

To keep a running total of the number of valid data entries for the variable of rank, simply @COUNT the number of entries. In cell B28, enter the formula @COUNT(B5...B24). This function, and the others listed below, simply reads down all the columnar cells from B5 through B24, and counts the number of non-blank values. Use @MIN(B5...B24) to determine the minimum rank value and @MAX(B5...B24) to determine the maximum rank value. Place these functions in cells B29 and B30, respectively. Similarly, you can enter the functions of @SUM(B5...B24) and @AVE(B5...B24) in cells B31 and B32, respectively, to compute these values for the variable of rank.

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Before we discuss how to use these newly found values to compute other descriptive statistics, let's /Reproduce these functions for each of the other variables. Simply place the cursor in cell B28. Then enter /Reproduce and RETURN. THE Spreadsheet's edit line will display B28. Enter a colon (:), then C28...F28, and press RETURN. Enter Relative to the computer queries.

You can now /Reproduce the @MIN, @MAX, @SUM, and @AVE functions in this same manner for each of the variables. Just move the cursor to the next row (cell B29), and /Replicate these functions into cells C29 through F29 by following the same procedure outlined above. Go ahead and do this now. Don't worry about the displayed values. Once we enter the data, we will enter ! and if we entered everything correctly, all the displayed values will be the appropriately computed values for each of the variables. Pretty easy and pretty neat!

Computing Other Summary Statistics

Up to this point it has been quite easy to compute each of the descriptive statistics since specific functions exist. We will spend the next several minutes on how to compute other descriptive statistics for which no functions exist.

The easiest place to begin is with the range statistic. The range may be computed by subtracting the minimum value from the maximum value. For the variable of rank, cell B30 contains the maximum value and cell B29 contains the minimum value. Therefore, place your cursor in cell B33 and enter the formula:

+B30 - B29 (RETURN)

or, if you wish to report the inclusive range enter the formula:

+B30 - B29 + 1 (RETURN).

TABLE 1.2

UNIVARIATE SUMMARY DESCRIPTIVE STATISTICS

	A	B	C	D	E	F	H	I	J	K
1			Faculty	Data	Set -- 1983				Scratch	Space
2										
3	Faculty	ID	Rank	Degree	Income	Yrsemp	Sex	X	(X-M)^2	(X-M)^3	(X-M)^4
4										
5	Faculty	# 1							(H5-H32)^2	(H5-H32)^3	(H5-H32)^4
6	Faculty	# 2							(H6-H32)^2	(H6-H32)^3	(H6-H32)^4
7	Faculty	# 3							(H7-H32)^2	(H7-H32)^3	(H7-H32)^4
8	Faculty	# 4							(H8-H32)^2	(H8-H32)^3	(H8-H32)^4
9	Faculty	# 5							(H9-H32)^2	(H9-H32)^3	(H9-H32)^4
10	Faculty	# 6							(H10-H32)^2	(H10-H32)^3	(H10-H32)^4
11	Faculty	# 7							(H11-H32)^2	(H11-H32)^3	(H11-H32)^4
12	Faculty	# 8							(H12-H32)^2	(H12-H32)^3	(H12-H32)^4
13	Faculty	# 9							(H13-H32)^2	(H13-H32)^3	(H13-H32)^4
14	Faculty	#10							(H14-H32)^2	(H14-H32)^3	(H14-H32)^4
15	Faculty	#11							(H15-H32)^2	(H15-H32)^3	(H15-H32)^4
16	Faculty	#12							(H16-H32)^2	(H16-H32)^3	(H16-H32)^4
17	Faculty	#13							(H17-H32)^2	(H17-H32)^3	(H17-H32)^4
18	Faculty	#14							(H18-H32)^2	(H18-H32)^3	(H18-H32)^4
19	Faculty	#15							(H19-H32)^2	(H19-H32)^3	(H19-H32)^4
20	Faculty	#16							(H20-H32)^2	(H20-H32)^3	(H20-H32)^4
21	Faculty	#17							(H21-H32)^2	(H21-H32)^3	(H21-H32)^4
22	Faculty	#18							(H22-H32)^2	(H22-H32)^3	(H22-H32)^4
23	Faculty	#19							(H23-H32)^2	(H23-H32)^3	(H23-H32)^4
24	Faculty	#20							(H24-H32)^2	(H24-H32)^3	(H24-H32)^4
25										
26	Summary		Statistics							
27										
28	Count		@COUNT(B5...B24)				@COUNT(F5.F24)	@COUNT(H5...H24)		
29	Minimum		@MIN(B5.B24).....				@MIN(F5.F24)			
30	Maximum		@MAX(B5.B24).....				@MAX(F5.F24)			
31	Sum		@SUM(B5.B24).....				@SUM(F5.F24)	@SUM(H5...H24)	@SUM(I5...I24)	@SUM(J5...J24)	@SUM(K5...K24)
32	Average		@AVE(B5.B24).....				@AVE(F5.F24)	@AVE(H5...H24)			
33	Range		(B30-B29).....				(F30-F29)				
34	Variance							+I31/(H28-1)			
35	St. Dev.							@SQRT(I34)			
36	Skewness							(H28*J31)/(H28-1)*(H28-2)*(I35^3)			
37	Kurtosis							((H28*(H28+1)*K31)-((3*I31*I31)*(H28-1)))/ ((H28-1)*(H28-2)*(H28-3)*(I35^4))			

NOTE: Columns are not of the same width and column G is missing (left blank) so that you may more easily see the formula. Where you see ....., please /Replicate the formula between these columns and answer Relative to the inquiries from the computer.

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DATA ANALYSIS (PART 1)

After choosing the most appropriate computational strategy for your needs, simply /Replicate this range formula to the other variables (e.g., columns C through F).

Data analysts are typically interested in summarizing the degree of spread of scores about the mean value. Most often reported statistics include the variance, standard deviation, skewness and kurtosis.

The standard deviation is useful since it helps to define the proportion of scores which fall within known limits of the mean score. We can expect, for example, in a distribution which is more or less normal, approximately 68% of all the values for each variable falling between +1 and −1 standard deviation units from the mean value and 95% of all these values falling between +2 and −2 standard deviation units from the mean value. Skewness and kurtosis are descriptive measures which summarize the degree to which a unimodal distribution departs from normality. If the distribution was "normal," then skewness and kurtosis would approach zero. The further away from zero, the more abnormal the distribution.

The computation of these statistics requires only slightly more effort than the computation of the range. The formulae for each of these measures are:

$$\text{Variance} = \frac{\text{Sum (X - Mean)}^2}{\text{Count - 1}} \text{ or } \frac{M^2}{\text{Count - 1}} \quad [1]$$

$$\text{Standard Deviation} = \text{SQRT (Variance)} \quad [2]$$

$$\text{Skewness} = \frac{\text{Count} * M^3}{(\text{Count-1}) * (\text{Count-2}) * S^3} \quad [3]$$

$$\text{Kurtosis} = \frac{\text{Count (Count + 1)} M^4 - 3 M^2 M^2 (\text{Count-1})}{(\text{Count-1}) (\text{Count-2}) (\text{Count-3}) S^4} \quad [4]$$

where:

S = standard deviation

$$M_r = \text{SUM}_{i=1}^{n} (X - \text{Mean})_i^r$$

(See C.I. Bliss, 1967; and Hull and Nie, 1981, for further documentation on these statistics.)

It may not be readily apparent, but it is not difficult to determine the correct values for each of these descriptive measures. All that need be done is to set up the worksheet with four additional columns of scratch or computational space. We will use columns H through K. Column H will replicate the original values for the variable of interest, and recompute the @COUNT, @SUM, and @AVERage values. Column I will be used to compute the sum of squared deviations about the mean, or, for each subject, (X − Mean)Λ2 will be computed. Then, after entering the formula (H5−H32)Λ2 in cell I5, simply /Replicate this formula in cells I6 through I24, remembering to answer relative to the first query of the computer and no change to the second query. Once computed, we will then sum these values by entering in cell 131 the function @SUM(15...I24), then compute the variance in cell I134 (i.e., +I31/(H28−11)), and standard deviation in cell I35 (i.e., @SQRT (I31)).

Similarly, column J will be used to compute skewness. For each subject, we will compute the deviations between his/her value and the mean value, and then cube this result by using the formula: (X − Mean)Λ3 in cells J5 through J24. The actual formula to enter in cell J5 is: (+H5 − H32)Λ3 . Simply /Reproduce this formula through cell J24. In cell J31 enter @SUM(J5...J24). In cell J36, enter the formula:

```
(H28 * J31) / (H28 -
1) * (H28 - 2) * (I35Λ3)
```

This will compute the value for skewness. The larger this computed value — in either the negative or positive direction, the poorer the symmetry of the data about the mean and the greater the departure from normality.

The procedure for computing kurtosis is essentially the same as that for computing skewness. Using the formula: (X − Mean)Λ4 enter it into cell K5 (+H5−H32)Λ4. Then, /Reproduce this formula through cell K24 and place @SUM(K5...K24) in cell K31. In cell K37, enter the formula:

```
( (H28) * (H28 + 1) * K31 -
(3 * I31 * I31) * (H28-1) ) /
( (H28-1) * (H28-2) * (H28-3) * (I35Λ4) )
```

(Before going much further, check your formulae with those listed in Table 1.2. Also, this is a good time to SAVE your worksheet. After all, you never know when lightning may strike. So, take a moment and save your worksheet.)

Take a minute and convince yourself that these little formulae work and are an efficient way to summarize data. After all, with this template, I can now compute the most often used summary descriptive statistics of any data set by simply inserting or deleting appropriate rows and columns and /Reproducing appropriate formula into these new rows or columns.

Okay, we now have all the formulae we need. All that remains to be done is to simply enter a data set. See Table 1.3. for a copy of the data set we will use throughout this series. Then enter it into your template.

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TABLE 1.3.

FACULTY DATA SET, 1983

	A	B	C	D	E	F
1			Faculty Sample: 1983			
2	==========	==========	==========	==========	==========	==========
3	Faculty ID	Rank	Degree	Income	Yrsemp	Sex
4	----------	----------	----------	----------	----------	----------
5	Faculty # 1	3	3	18442	8	1
6	Faculty # 2	1	2	12167	7	0
7	Faculty # 3	3	3	16858	19	0
8	Faculty # 4	3	3	20641	1	1
9	Faculty # 5	2	2	25000	1	1
10	Faculty # 6	4	3	20970	23	1
11	Faculty # 7	1	1	14775	1	1
12	Faculty # 8	2	2	15441	20	0
13	Faculty # 9	2	2	15595	17	0
14	Faculty #10	2	3	17940	8	0
15	Faculty #11	1	1	9525	1	0
16	Faculty #12	4	3	20690	11	0
17	Faculty #13	1	2	11865	1	1
18	Faculty #14	2	2	14381	31	0
19	Faculty #15	1	1	8250	0	1
20	Faculty #16	2	2	15000	4	1
21	Faculty #17	3	3	17117	7	0
22	Faculty #18	4	3	28414	2	1
23	Faculty #19	3	3	17424	5	1
24	Faculty #20	1	1	8494	3	0
25	----------	----------	----------	----------	----------	----------

All right, what do the results tell us about this random sample of 20 faculty. Briefly, for the faculty sample, half of those included were men and half were women, most held at least a master's degree and had worked, on the average, less than nine years at the institution. Most faculty were in the junior ranks and the average faculty salary was slightly more than $16,000 per year.

Conclusion

We have examined an efficient way to statistically summarize a variety of variables. You might wish to try these procedures on a data set of interest to you. Now that you know how to do it, go ahead and do it. In the next article we will examine how to display the data in tabular form by constructing simple and grouped frequency distributions and creating bar graphs. See you then.

Now, /Reproduce each variable values, taking each variable one at a time, into column H, rows 5 through 24; enter the ! command to recompute all the values; transfer the summary statistics of variance, standard deviation, skewness and kurtosis into the appropriate column under the variable of interest, and then /Reproduce the next variable values in cells H5 through H24. We only create this template once, therefore, then move the next set of values into column H, enter the ! command, and automatically compute the new summary statistics for that variable.

By the way, if you feel the need, send the data to a mainframe and run *SPSS* or some other statistical package. You'll see the same results. But, before you run to do this, check your results with those of Table 1.4. All the summary statistics are reported below each variable. Values in column H through K are for the variable of rank.

TABLE 1.4

UNIVARIATE SUMMARY DESCRIPTIVE STATISTICS

	A	B	C	D	E	F	G	H	I	J	K
1			Faculty Data Set -- 1983							Scratch	Space
2	==========	==========	==========	==========	==========	==========		==========	==========	==========	==========
3	Faculty ID	Rank	Degree	Income	Yrsemp	Sex		X	(X-M)^2	(X-M)^3	(X-M)^4
4	----------	----------	----------	----------	----------	----------		----------	----------	----------	----------
5	Faculty # 1	3	3	18442	8	1		3	.562500	.421875	.31641
6	Faculty # 2	1	2	12167	7	0		1	1.56250	-1.9531	2.4414
7	Faculty # 3	3	3	16858	19	0		3	.562500	.421875	.31641
8	Faculty # 4	3	3	20641	1	1		3	.562500	.421875	.31641
9	Faculty # 5	2	2	25000	1	1		2	.062500	-.01563	.00391
10	Faculty # 6	4	3	20970	23	1		4	3.06250	5.35937	9.3789
11	Faculty # 7	1	1	14775	1	1		1	1.56250	-1.9531	2.4414
12	Faculty # 8	2	2	15441	20	0		2	.062500	-.01563	.00391
13	Faculty # 9	2	2	15595	17	0		2	.062500	-.01563	.00391
14	Faculty #10	2	3	17940	8	0		2	.062500	-.01563	.00391
15	Faculty #11	1	1	9525	1	0		1	1.56250	-1.9531	2.4414
16	Faculty #12	4	3	20690	11	0		4	3.06250	5.35937	9.3789
17	Faculty #13	1	2	11865	1	1		1	1.56250	-1.9531	2.4414
18	Faculty #14	2	2	14381	31	0		2	.062500	-.01563	.00391
19	Faculty #15	1	1	8250	0	1		1	1.56250	-1.9531	2.4414
20	Faculty #16	2	2	15000	4	1		2	.062500	-.01563	.00391
21	Faculty #17	3	3	17117	7	0		3	.562500	.421875	.31641
22	Faculty #18	4	3	28414	2	1		4	3.06250	5.35937	9.3789
23	Faculty #19	3	3	17424	5	1		3	.562500	.421875	.31641
24	Faculty #20	1	1	8494	3	0		1	1.56250	-1.9531	2.4414
25	----------	----------	----------	----------	----------	----------		----------	----------	----------	----------
26	Summary	Statistics									
27	----------	----------									
28	Count	20	20	20	20	20		20			
29	Minimum	1	1	8250	0	0					
30	Maximum	4	3	28414	31	1					
31	Sum	45	45	328989	170	10		45	21.7500	6.37500	44.391
32	Average	2.25	2.25	16449.	8.5	.5		2.25			
33	Range	3	2	20164	31	1					
34	Variance	1.1447	.61842	2.68E7	79	.26316			1.14474		
35	St. Dev.	1.0699	.7864	5174.6	8.8882	.51299			1.06992		
36	Skewness	.30439	-.496	.4274	1.2028	0				.304387	
37	Kurtosis	-1.092	-1.152	.34442	.62441	-2.235					-1.092

The variable of rank is reproduced in column H-K. To determine other variable summary statistics, just replace the data for rank with the appropriate variable data in your worksheet and enter !

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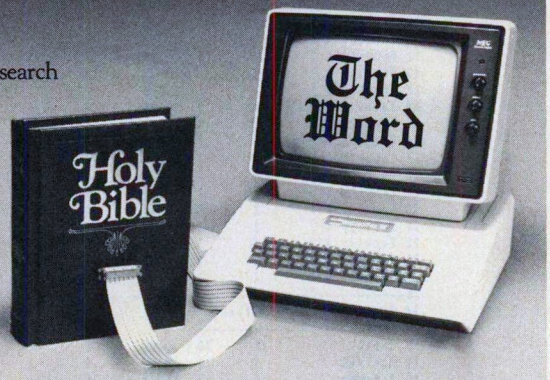
For Those Who Seek.



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```
]LIST

0  REM * SO WHAT
     DID YOU EXPECT *

  RETURN AFTER GOSUB NOT
        RUSS BOGUE
     CALL -A.P.P.L.E.
           *
10   HOME : TEXT : VTAB(23)
20   PRINT "CONVERT HEX:
     $FF="
30   POKE 32,20: POKE 33,5:
     PRINT

40   FOR J = 1 TO 50: GOSUB
     250: NEXT

250   FOR K = 1 TO 4: GOSUB
      253: NEXT

253 I = I + 1: PRINT I
255  RETURN
```

STRICTLY BUSINESS

Mike Regeimbal

EVERY management decision within an organization ultimately requires putting the assets of the organization at risk. The further up the organization ladder, the greater the opportunity to put a multitude of assets on the line. While there are a multitude of reasons why businesses fail, most often the reason they succeed is because of good management. By definition, successful management means making all the right decisions while putting the assets of the business at risk.

Mostly the risk taken by management is intuitive in nature. Our economy would grind to a slow halt if management required perfect knowledge (the paralysis of analysis) for every decision. The decision process is a trade off between analysis and expedience. For capital asset acquisitions, there are several well regarded methods of investment analysis which will help even the novice reduce risk.

Decisions concerning capital acquisitions become complex in part because the manager's analysis will affect an extended period of time. It is this commitment to the future that endangers the viability of any business. The lack of perfect knowledge on the part of some managers (most managers are aware of the degree of their perfection), dictates the use of differing models to evaluate the cost/benefit of the investment proposal. Of the many different methods of analyzing capital acquisitions, three are used most frequently. They are:

1) *The Payback Method* — which identifies the number of years required to return the original cost of the investment back to the company.
2) *The Internal Rate of Return Method* — which indicates the present value interest rate of future expected returns.
3) *The Net Present Value Method* — which identifies the difference between the discounted value of future cash flows at the cost of capital and the cost associated with the capital investment.

First of all, for purposes of this article, the cost of capital is the interest rate you would be charged if you were to borrow money from a lending institution. To better understand these methods, a common example of purchasing a microcomputer for $1000 will be used for all three methods. We will assume that the lending institutions are asking 10% for their services.

The Payback Method

A survey made by the Machinery and Allied Products Institute indicated 60% of the surveyed firms use the payback period. On equipment with a service life of 10 years or more, 28% of those using the method set a three year payback and 34% set a five year payback. Only 16% use a payoff of more than five years. To help understand this method, let's assume a person's time is worth $20 per hour. With the purchase of the $1000 microcomputer you can save one hour per month and keep the general ledger in somewhat better assemblence of balance. For depreciation purposes, we will use the same five year schedule the I.R.S. uses (15% the first year, 22% the second and 21% the remaining three years). In addition we will assume the marginal tax rate to be 50%.

Year	Savings	Depreciat	Cashflow	CUM
1	240	150	315	315
2	240	220	350	665
3	240	210	345	1010
4	240	210	345	1355
5	240	210	345	1700

Twelve months times $20 gives the savings. Depreciation of $150 will save $75 in taxes which when added to the savings, totals $315. What we are searching for is that point in time at which we have recouped our initial investment of $1,000. As you can see, the payback period would be just under three years.

Internal Rate of Return

This procedure can best be defined as the interest rate that equates to the present value of the expected future receipts of the investment outlay. Obviously, we need to define the statement "present value of future cash receipts." If we were to receive $100 a year from now or receive $90.90 (which is the present value of that future cash receipt) today, which can be invested at 10%, we would essentially be receiving the same amount of money.

Determining the internal rate of return requires a trial and error process. First the present value of the cash flows from an investment, using an arbitrarily selected interest rate must be made. Using a 10% arbitrarily selected interest rate and our previous example the following analysis would be used:

NET	DISCOUNT	PRESENT VALUE
315	1/1.10 OR .909	286
350	.909/1.10 OR .826	289
345	.826/1.10 OR .751	259
345	.751/1.10 OR .683	236
345	.683/1.10 OR .621	214
TOTAL		1284

Because the present value of future cash flows ($1,284) is greater than the initial investment of $1000, we know that the interest rate should be higher. Using a 20% arbitrarily selected interest rate, we come a lot closer to the initial investment.

—◉→

business

NET	DISCOUNT	PRESENT VALUE
315	1/1.20 OR .833	262
350	.833/1.20 OR .694	243
345	.694/1.20 OR .578	199
345	.578/1.20 OR .482	166
345	.482/1.20 OR .402	139
TOTAL		**1009**

Since the present value of future cash flows at 20% ($1,009) very closely resembles our initial investment ($1000) we can safely say our Internal Rate of Return (IRR) is 20%. What the IRR yields is only a reference point to help decide whether or not to buy this microcomputer. Alternative capital equipment may have an IRR of 60%. If a capital acquisition indicated a 6% IRR, it may be beneficial to forego the purchase in favor of other investments yielding greater than 6%.

Net Present Value

The last method we will examine also uses discounted expected future cash flows. This technique differs from the previous example in that rather than hunt and peck for the appropriate interest equivalent, future cash flows are discounted at the cost of capital, which in this case we ground-ruled as 10%. We know from the previous example that the discounted total at 10% is $1,284. Subtracting the initial cash outlay of $1000 from the discounted total of $1,284 yields a positive number indicating a return on investment in excess of the cost of capital. Conversely, if a negative number were to appear, the return on investment would be lower than the cost of capital. Using cost of capital as the benchmark for minimum return on investment will provide another reference point for your analysis. The net present value method is most effective when used to compare alternative investment avenues.

What has been presented is an overview of analysis that will help you decide on a capital expenditure. The level of detail and alternatives usually rise as the cost of the investment warrants. Please don't be fooled into thinking this is a panacea for all your procurement needs. It is but one of a spectrum of inputs that should be included in your capital investment analysis. The following is a summary of the three different capital investment analysis methods presented in this article:

ITEM	PAY-BACK	I.R.R.	NET P.V.
ANSWER	YEARS	%	$
TIME VALUE $	NO	YES	YES
CASH FLOW	YES	YES	YES
ADVANCED CALCULATIONS	NO	YES	YES
	SIMPLE	GUESS	EASY
MEASURES	RE-COVERY PERIOD	R.O.I.	EXCESS RETURN
COST OF CAPITAL DEPENDENT	NO	NO	YES
RECOMMENDED	YES	YES	YES

For more information on the above, the following sources were used for this article "Financial Management" by Robert W. Johnson; "Take The Mystery Out Of Capital Expenditure Decisions" by Mustafa H. Abdelsamad, D.B.A.; "Essentials Of Managerial Finance" by J. Fred Westin.

Software Review

This months software selection is titled "Business Cycle Analysis," by Instant Software. The program is designed to graphically display data on a 12 month moving average curve or as a pressure curve. The twelve month moving average curve reflects as data midpoints, 12 months added together and divided by twelve. For example, a January through December 12 month moving average would be displayed in July. February through January would be displayed in August. The 12 month moving average helps to smooth out irrelevant fluctuations in the business cycle.

The pressure curve is used to depict the rate of change when contrasted to the 12 month moving average. The resulting graph depicts the ratio between the centered 12 month moving average data point and the data point for the same period a year earlier. Pressure curves will not only show the rate of change in a data series but will visually depict the change in terms of increasing, constant or declining rate of change.

This program will enable the user to analyze a data series and study its relationship to the business cycle. Why should you be interested in the business cycle? The National Bureau of Economic Research defines the business cycle as "expansions occurring at about the same time in many economic activities, followed by similarly general recession, contractions, and revivals which merge into the expansion phase of the next cycle." Since 1854 the NBER has recorded 28 complete cycles averaging 33 months of expansion and 19 months of contraction. The turning points in these cycles should be another piece of information used to determine policy concerning such activities as hiring, inventory, investments, capital purchasing and credit.

I found this program to be very easy to use. Reference to the documentation was required more for an understanding of the term pressure curve than how to get the program up and running. It should be noted that a minimum of 60 values are required for 12 month moving average and pressure curve analysis. My only criticism with this program is that the identifying characteristics of points on the vertical axis reside on the right hand side of the vertical axis rather than the usual left hand side of the vertical axis. Consequently, when graphing raw data, the characters identifying the vertical axis of the graph will get intermingled with the plot of points.

business

Book Review

This month's selection is titled "Computer choices" by H. Dominic Covvey and Neil Harding McAlister. This book addresses some of the more common problems when procuring or developing a computing system. This book explores the significant technical and managerial issues when pursuing a computing project. It identifies three areas which the reader should be knowledgeable in before broaching a computing project. These areas are consumer issues, technical issues, and management issues.

The section on consumer issues focuses on eliminating misconceptions concerning computers. It looks at what the computer is and is not, and why many buyers are stuck with computers that became an albatross.

The second section of the book reviews technical issues. The dominant theme of this section is software development. A discussion of making software compatible with the user, cost of software development, minimum documentation requirements and security are all included in this section.

The last section is a review of management issues. Included in this part are discussions concerning selling computing proposals to upper management, pressures for and against automation, and review of some of the problems with turnkey systems.

Computer choices seems to have been written on two different levels and targeted to two different groups of people. The first section on consumer issues is very educational and very applicable for those people in the market for a computer system. The second two thirds deals with software engineering and is too broad to be of any use to those people who would use this information. No one can even begin to address the issues impacting software engineering in 130 pages, even if it is small type. I would recommend checking the book out of the library before investing money.

Next month we will delve into productivity. Specifically we will look at how the personal computer can help with the four functions of the manager, planning, directing, staffing, and controlling. The book review for next month will be "Getting Down to Business With Your Microcomputer."

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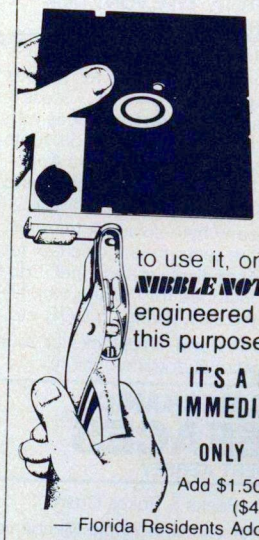

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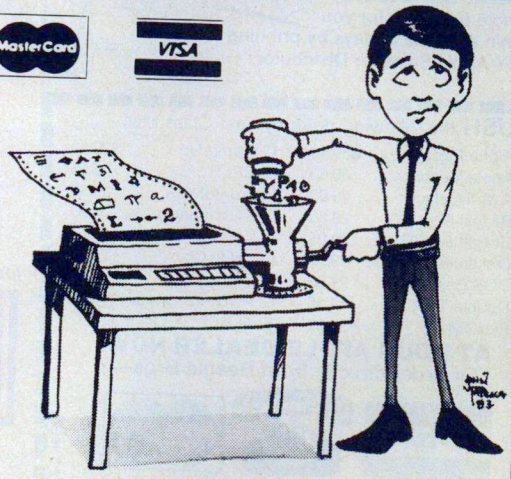

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MORE: Useful music, text and hi-res tricks for your programs. Clear educational documentation.

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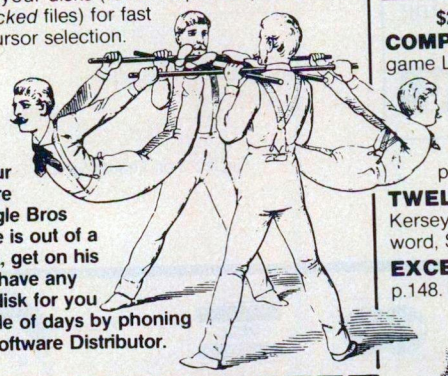
BEAGLE MENU: Display only the file names you want from your disks (for example, only *Applesoft* or only *Locked* files) for fast one-key cursor selection.



GOTO your Apple Software Store for Beagle Bros products. If he is out of a particular disk, get on his case. He can have any Beagle Bros disk for you within a couple of days by phoning ANY Apple Software Distributor.

DOS BOSS

DISK COMMAND EDITOR
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RENAME DOS COMMANDS & Error Messages—"Catalog" can be "Cat"; "Syntax Error" can be "Oops" or almost *anything* you want it to be.

PROTECT YOUR PROGRAMS. An unauthorized Save-attempt can produce a "Not Copyable" message, or *any* message you want. Also easy List-Prevention and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change the catalog Disk Volume heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and educational Apple experiments.

ANYONE USING YOUR DISKS (booted or not) will be using DOS the way YOU designed it.

```
10 LIST: LIST: LIST: FOR ZZ=PEEK(175)+PEEK
(176)*256+36 TO 3072: POKE ZZ,216: NEXT
20 FOR XXX=1 TO 2: POKE-16299,0: POKE
-16300,0: XXX=1: NEXT: REM Experiment
with different length variable names.
```

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COMPARE BEAGLE BAG with any single-game Locked-Up disk on the market today. All 12 games are a blast, the price is a bargain, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn programming tricks by seeing how they work.

TWELVE GAMES from the Applesoft Ace, Bert Kersey— TextTrain, Wowzo, Magic Pack, Buzzword, Slippery Digits, and many many more...

EXCELLENT REVIEWS—See Jan-83 *Softalk*, p.148. Beagle Menu too: see Typefaces description.

#8

NEW! SILICON SALAD

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MANY MINI-UTILITIES: Disk Scanner finds bad disk sectors, **Key-Clicker** adds subtle sound as you type, **DOS-Killer** adds two tracks of space to your disks, **2-Track Cat** allows up to 210 file names per disk, **Program Splitter** makes room for hi-res pix with large Applesoft programs, **Text Imprinter** transfers text to the hi-res screen, **Onerr Tell Me** prints the appropriate error message but continues program execution, **Text Screen Formatter** converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Including fantastic programming tricks from Beagle Bros Tip Books 5, 6 and 7, plus our Tips & Tricks Chart #1.

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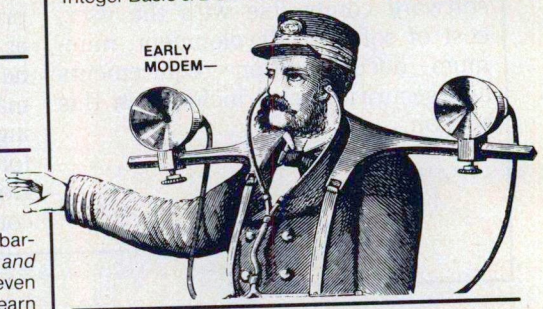
100 LISTABLE PROGRAMS from Beagle Bros Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for Apple experimentation.

COMMAND CHART INCLUDED: Free with each Tip Disk; an 11 x 17 poster of all Applesoft, Integer Basic & DOS Commands with Descriptions!



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ADD GRAPHICS TO TEXT or add Text to hi-res graphics. Run your existing Applesoft programs under Flex Type control. Fast, easy to use, and Compatible with GPLE and Double-Take.

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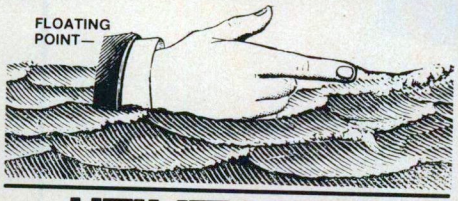
80-COLUMN COMPATIBILITY: All edit & global features support **APPLE IIe** 80-column cards and most 80-column cards on *any* Apple IIe, II+ or II.

DEFINABLE ESC FUNCTIONS: Define ESC plus any key to perform any task. For example, **ESC-1** can catalog drive 1, **ESC-L** can do a "HOME: LIST", **ESC-N** could type an entire subroutine... *Anything* you want, *whenever* you want.

GPLE DOS MOVER: Move DOS and GPLE to Language Card (or IIe upper 16K) for an EXTRA **10,000 BYTES** (10K) of programmable memory.

Plus APPLE TIP BOOK #7: Learn more about your Apple! Includes all new GPLE tips and tricks.



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DRAW IN HI-RES on both Apple "pages" using easy keyboard commands OR paddles/joystick. Pre-view lines before plotting. Solid or mixed colors & Reverse (background-opposite) drawing. FAST one-keystroke circles, boxes & ellipses, filled or outlined. Add text for graphs & charts. All pix Save-able to disk, to be called from your Applesoft programs.

COMPRESS HI-RES DATA to 1/3 disk space (average) allowing more hi-res pictures per disk.

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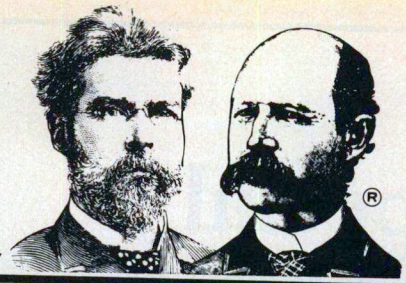

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APPLESOFT ENHANCER
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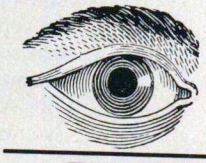
RENAME ANY APPLESOFT COMMAND or Error Message to anything you want. For program clarification, encryption/protection or even foreign translation. Plus add optional powerful NEW COMMANDS:

ELSE follows If-Then statements, like this:
IF X=2 THEN PRINT "YES": *ELSE* PRINT "NO"

HSCRN reads color of any hi-res dot for collision testing. **SWAP X,Y** exchanges 2 variables' values. New **TONE** command writes music with no messy pokes & calls. **SCRL** scrolls text in *either* direction. **TXT2** lets Text Page 2 act exactly like Page 1.

PLUS: GOTO & GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by special ESC CURSOR. Replace awkward Graphics screen-switch pokes with 1-word commands. Change ctrl-G Beep to any tone. **INVERSE REMS** too! All GPLE compatible.



```
1 FOR S=768 TO 773: READ A:
  POKE S,A: NEXT: POKE 232,0:
  POKE 233,3: DATA 1,0,4,0,5,0
2 HGR2: FOR R=0 TO 192: ROT=R:
  SCALE=96: XDRAW 1 AT 140,95:
  SCALE=30: XDRAW 1 AT 140,95:
  S=PEEK(49200): NEXT: RUN
```

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HIGH-SPEED DOS / DOS-MOVE UTILITY
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TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra memory by moving DOS.

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
BLOAD LANGUAGE CARD	13 sec.	4 sec.
(Text Files: No Change)		

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with all DOS Commands, GPLE, Double-Take, DOS Boss, Diskquik and almost all unprotected programs.

MOVE DOS to your Language Card, RAM Card, or standard Apple IIe upper 16K, freeing up **10,000 EXTRA BYTES** of memory for your programs.

15 EXTRA SECTORS per disk. Catalog Free-Space displayed every time you catalog a disk.

TYPE-COMMAND ("TYPE filename") prints contents of any Text File on screen or printer.

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by HARRY BRUCE and GENE HITE

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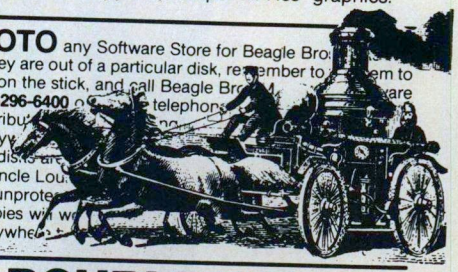
Requires Apple IIe with Extended 80-column Card.

ACTS LIKE A DISK DRIVE in Slot 3, but much faster, quieter, more reliable and $350 cheaper. Enjoy the benefits of a 2nd (or 3rd or 4th...) drive at less than 1/10th the price. Catalogs normally with "CATALOG, S3" command. Load & Save any kind of files into RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, Diskquik operates silently and at super-high speeds. See it to believe it. Your Apple IIe's Extended 80-column Card (required) can hold about half the amount of data as a 5¼" floppy disk!

MANY USES: For example, load often-used files, like FID and other utilities, into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.

FRIENDLY & COMPATIBLE with 80-column display, GPLE, ProntoDOS, and all normal Applesoft and DOS commands and procedures. Will not interfere with Apple IIe "Super Hi-Res" graphics.



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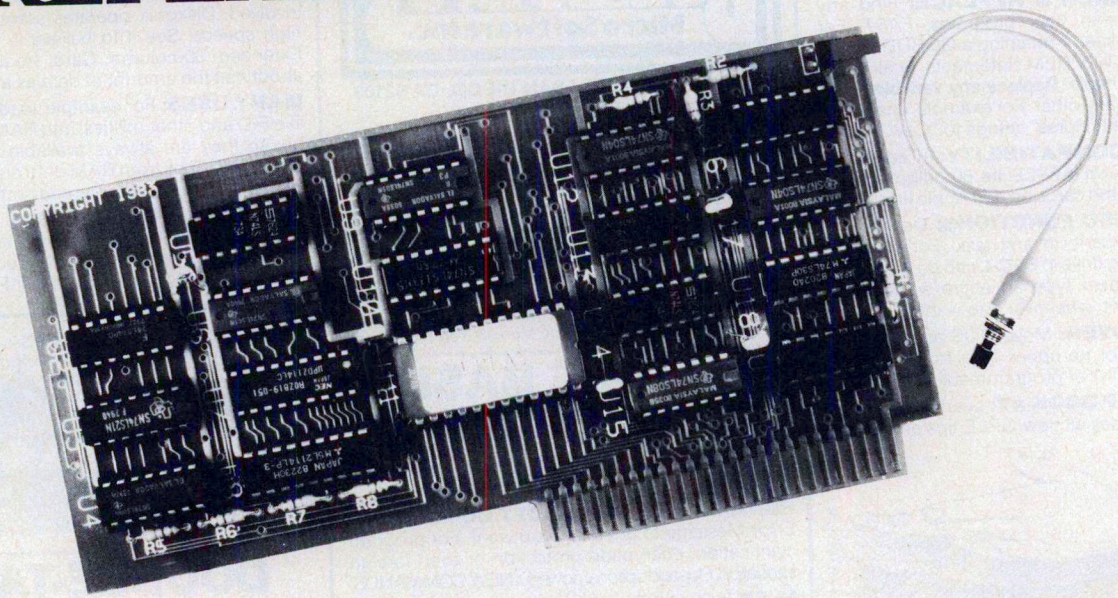

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Circle 35 on Reader Service Card

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Local file transfers allow DOS, CP/M, or Pascal files to be displayed, printed, or even copied to another disk. For example, a file on a CP/M formatted disk in Drive 1 could be copied to a Pascal formatted disk in Drive 2 providing a complete format conversion capability. Numerous editing options such as tab expansion and removing unwanted characters allow easy reformatting of data to accommodate the variations in data formats used by host computers.

Multi-Protocol File Transfer Capability

Softerm 1 offers file transfer methods flexible enough to match any host computer requirement. These include the *character* protocol with user-definable characteristics to provide maximum flexibility for text file transfers to any computer. The CP/M User's Group standard *XMODEM* protocol may be used for binary file transfers with systems using the CP/M operating system. The intelligent *Softrans* protocol can be used to transfer *any* type file and provides automatic binary encoding and decoding, error detection and automatic retransmission, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm 1 which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol. Specific host computer versions of the Softrans FORTRAN program are available on request.

Softerm file transfer utilizes an easy to use *command language* which may be executed interactively or from a *macro* command file which has been previously entered and saved on disk. Twenty-three high-level commands include *DIAL, CATALOG, SEND, RECEIVE, ONERR, MONITOR, HANGUP,* and others. A *SCHEDULE* command even allows file transfers at a specific date and time.

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Circle 41 on Reader Service Card

THE COMPUTER IN THE SCHOOL:

TUTOR, TOOL AND TUTEE

Eric Flescher/reviewer

Edited by Robert P. Taylor
Teachers College Press
New York City
1980

THE age of computers has advanced upon us. Possibly you have been thinking about using computers in your classroom, with your children, or utilizing the devices yourself. If so, there is no better place to start than with the book, *The Computers in the School: Tutor, Tool and Tutee.*

Educators of all subject areas, as well as others who are considering using computers in various ways, will find this book helpful. The title of the book gives you a clue as to the multidimensional nature of computers. This is important in itself, for educators, parents, administrators, regardless of the level of expertise. There are many uses for computers in a variety of ways.

If there is a weakness, the book does not include information about programming, where to go for further information and basic information that a reader might need to get started at the ground level. It is not a "how to operate manual." It many ways, the authors assumes a basic knowledge and that the reader is looking for other possible applications in the use of computers. The book is good for those who are interested in developing knowledge of the flexible and versatile uses of the computers at home and in the classroom.

There are three ways in which the computers can be used. The editor, Robert E. Taylor, notes the three main roles.

1) The computer as a TUTOR– the computer once programmed, tutors students.
2) The computers as a TOOL– assisting in a variety of subject areas in a multitude of ways.
3) The computer as a TUTEE–. The computer can be tutored itself. It can be programmed for a variety of duties in many ways.

Dr.Taylor elaborates in the introductory essay about the three roles, gives as a point of reference the computers and their applications, importance and purposes. This serves as a starting point in learning. This is not meant to restrict your thinking about computers but serves as a reference point for you no matter what your level of expertise.

The three roles of the computers are then highlighted in a number of essays written by five prominent contributors who are are pioneers in the field of computer science education.

Each contributor uses examples of research and studies in which computers are used in conjunction with a variety of subject areas: i.e., math, science, logic, creativity and problem solving. These five pioneers candidly talk about their beliefs in regard to computer use. These beliefs are based upon their many years of experience.

The first contributor, Alfred Bork, describes the role of the computers in interactive learning, education, the value of writing, and graphics with computers. Thomas Dwyer speaks of techniques for using the computers to enrich education, problems in doing so, and the value of computers in individualized instruction. Arthur Luehrmann addresses topics about computers, society and related topics in science education. Seymour Papert writes about the computer's impact on education. He addresses the fields of math and touches upon the very important value and role of computers in creativity.

Many important references are made in regards to the machine's ability to enhance creativity, imagination, and the elevation of higher level thinking processes. Patrick Suppes addresses the uses of computers in individualized instruction and the use of computers with students, including the gifted and the exceptional. He also addresses many issues that come to the mind of many, as they begin to learn about computers: How will computers change the teacher's role? How will computers affect the teacher–administrator relationship? Is there a danger that the computers will impose rigid and impersonal regime on the classroom and even replace teachers?

The book includes important information concerning computer education with handicapped, the disadvantaged, the regular classroom student as well as the gifted, talented and creative students. The information given is much food for thought. Many issues are raised about the lack of computer science programs that promote innovative uses of computers. The authors also stress that the computers can help enhance individualization, enrichment, and independent study. More importantly, these devices can be used in the three roles previously mentioned, to help key on students strengths while also overcoming ability and skill weaknesses.

I'd recommend this book to all individuals, not just educators. It is a valuable resource to gain a better understanding of the innovative utilization of computers. By reading it, you may begin to understand and shape ways you would like to utilize computers. From my experience with microcomputers in the classroom, I have found the book helped me to think along the lines of more involved, interactive computer science education, other then the "drill and practice" type. It served to give me an intuitive feel for innovative uses of computers.

Once again, if you want a book to teach you programming, this book is not for you. But keep it in mind. No matter what your level of expertise, you will find it of interest. It will give you a better understanding of the value of computers and their innovative roles in education not only now, but for the foreseeable future.

education

APPLE /// REVOLUTIONIZES BRAILLE TRANSLATION

Evelyn Iritani

JIM Nelson, a blind student at the University of Washington, in Seattle, has tape-recorded his classes because he couldn't afford to wait up to a year to have a textbook transcribed into Braille using the time-consuming methods employed in the past.

"Many people who can use Braille have given up on it because it can't be produced in time to be useful," said the fifth-year student.

But Ed Godfrey, a 28-year-old Seattle native, hopes to improve the lives of Nelson and other blind people through a revolutionary computer program that transcribes English into Braille 200 times faster than the old system.

The UW's Braille project can be traced back to Godfrey's college years, when he learned the intricate writing system of the blind so he could send letters to a friend hundreds of miles away. But Godfrey soon grew frustrated with the limitations of the Braille transcription machines, which resembled manual typewriters.

A trained Braille transcriber using a Perkins Braille Writer could only produce 20 words per minute. A letter might take hours to complete. A book could take months, or even a year, to transcribe.

Then Godfrey met John Sherman, a congenial University of Washington geography professor who specializes in the problems of the blind and had developed an international reputation for his work with Braille maps.

It was a match somewhat close to perfect. Together, Godfrey and Sherman possessed a unique understanding of the problems of the visually handicapped as well as a working knowledge of Braille and computer programming. With funding from the Northwest Foundation for the Blind and the Washington State Council of the Knights of Columbus, they were able to put their dreams to the test.

"The connections between computers and Braille was very much there in my mind," Godfrey said. "But I had never had an opportunity to do anything with it."

The team chose the Apple *III* computer as the foundation for the project because of its inexpensive price tag, large storage capacity and programming flexibility. The total UW system, which cost approximately $24,000, contained the computer, a line-embossing device, a voice synthesizer and a printer.

The complexity of Braille, a system that utilizes variations of six raised dots to create configurations representing letters, contractions, numbers or punctuation signs, created numerous programming headaches for Godfrey.

"Braille is a very complicated system," he said. "It's not a problem of translating English into French or German... The computer looks for letter groupings. Somehow, the computer has to have in its memory a table that lays out all the rules for their use."

But last spring, several years and numerous false starts later, Godfrey and Sherman emerged from a small room on the UW campus with a computer program that transcribes English text into Braille accurately at speeds of *400 to 500 words per minute.*

The system also has the capacity to transcribe text into large print or synthesized voice for handicapped people who don't read Braille.

Last January, the UW's Braille Project began offering Braille transcription services to agencies serving the blind for the cost of the paper. So far, Godfrey has done work for the Internal Revenue Service, the Seattle School District, the governor's office and even a University District restaurant that wanted a Braille menu.

In the future, the team hopes the service will be used by agencies and blind people around the country who have been unable to get Braille materials easily because of the time and expense involved in the manual production.

"This increases the independence of a blind person," Sherman said. "In a restaurant, they can see what's on the menu rather then relying on somebody else to tell them what's available and how much it costs."

Greg Purcell, manager of the taxpayer service division of the Seattle IRS office, oversees a staff that includes four visually impaired people who answer tax questions over the phone. To conduct their job, they need quick access to up-to-date information. The UW's Braille Project met their needs.

"Our needs and their abilities came together," Purcell said.

For someone like Stuart Russell, a 31-year-old blind IRS employee, computers promise to open up a whole new world of information previously inaccessible in Braille. He foresees a time when the blind can tap into computer information networks that supply everything from local news and yellow page listings to stock market prices.

"The real gap of information is in the short-term," he said. "It's the kind of information that you would read in the paper tonight and line your garbage pail with tomorrow."

Plans are already underway to use the UW computer to produce Braille versions of the UW's 160 correspondence courses so blind students from Alaska to Germany can enroll in college-level courses long-distance.

By January 1984, the UW's Office of Independent Study hopes to offer the country's first Braille college-level correspondence course. And Jody Aliesan, the office's curriculum specialist, is also talking to UW officials about opening a Braille Center that would house a Braille library, a computer center, and other resources for the visually handicapped.

"With a center like this, students would come from all over the country to attend the University of Washington," she said.

—◉→

education

TWO VIEWS OF THE MICRO GOD?

Michael Shadick

The False Prophets:

Some critics of computers, see
The coming micro age
As yet acclaimed, much like a God!
Or like, at least, a "Sage"
Quite capable of solving all
The problems of the world.
"In truth," the critics might maintain,
"Computers should be hurled
From off the tallest building. For
They're neither God, nor Savior.
Indeed, they often cause a lot
Of deviant behavior!"

The Gospel, According to Saint Micro (And the Author, as well):

Our micros AREN'T the Diety.
They make US Gods, instead!
Computing, gives us "power" which
Our forbears never had.
'Tis due to INFORMATION, which
Computing helps provide.
It manifests itself in strength
Which comes from deep inside
OURSELVES. Computing cannot make
Our streets all golden-paved.
But, thanks to how it helps us, why,
The world may yet be saved!

BRAILLE TRANSLATIONS

The Northwest Foundation for the Blind, a private non-profit organization interested in research benefiting the visually handicapped, has already installed an Apple *III* system in its Seattle office with Godfrey's assistance. Joan Sadler, foundation consultant, said there are plans in the works to sell the Braille transcription services around the country.

"We find people are starving for this information," she said.

Next on line to install the Apple *III* system is the Washington Regional Library for the Blind, a government-funded resource center containing the state's only major Braille collection.

By next spring, Janet Ames, the library director, hopes to have the computer system in place at the library's new headquarters in Seattle. The Braille transcription services will be available to staff as well as the library's 7,500 borrowers.

"I'm sure the users are out there," she said. "We just have not had the capability before."

For Ames and others who have spent years working with blind people in a world designed for the sighted, the new vistas created by the computer age are mindboggling.

"Technology has a lot to offer this group of people," she said.

education

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AN APPLE FOR THE TEACHER

Kathryn Hallgrimson Suther/reviewer

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126 Lighthouse Avenue
Santa Cruz, CA 95060
Copy protected
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THE first three products to be reviewed may be of particular interest to teachers. When I was teaching, word search puzzles were very popular with my students. I used to make my own puzzles using words from a unit we had just completed. Usually I would have them ready at test time, therefore the students who completed their test could take a puzzle and work on it while their classmates finished their work. This was effective in maintaining a quiet test environment.

Making these puzzles by hand was a time consuming affair. First, I would figure out the vocabulary to be covered and then make the graph. Finally the puzzle had to be typed on a ditto master and copies run off on the copy machine. I'd usually keep them (gems of the trade) and reuse them the next year as units remained in the curriculum. After a certain amount of use, however, the dittos would no longer make clean copies. Obviously, they would have to be retyped. After all that work it truly seemed a shame to have to re-type them, but it was worthwhile nonetheless.

Enter Word Search produced by Hi Tech of Santa Cruz. This product is a real time saver. The system requirements include: An Apple][+ or *//e*, 48K, one disk drive, and any printer. In ten minutes or less I was able to produce the example below. The instruction sheet provided with the program is well written and easy to understand. I found you didn't even need to read the instructions as the menu provided and comments written into the program were self explanatory.

To make your puzzle, simply boot up the disk and type 1 for *Make a new word search puzzle*. You then are directed to choose the size of puzzle you wish to create. You can have from five to twenty rows and columns. If by chance your word(s) are too long for the length chosen, a message will appear and direct you to change the size of your puzzle. Simply type L from the menu displayed on your screen and before your eyes the words already typed in will move to a larger puzzle. The last word you typed in is also displayed in inverse so you can easily pick up where you left off. Such a breeze!!

MR. SMITH DECEMBER 1, 1983

NAME .....

FIND AND CIRCLE THE ENTOMOLOGY TERMS HIDDEN WITHIN THIS PUZZLE.

** ENTOMOLOGY SEARCH **

```
R L W A R E T P O R E M E H P E O K A D
Y L E P I D O P T E R A C T I S A W A N
H M V W O Q Y G O L O M O T N E T K R O
A L E T B T E N T O M O L O G I S T E T
V A C T H L Y K S U O I C A D E R P T K
H I Z O A Y L M D T B O K H Q H U T P N
S V R B R L N L R E L P N P M A S G O A
X A N K N T P I L E D N A C W L M A C L
X N G M C C C A O H D I W Q I O Q R E P
C P E L J O S P N Y M M R S U B V E L E
B Y A M P T T F G M O S Z M U A W T P A
E C S T O E Q E M E D E R X Y T T P B D
T J E M R D R C H N O C A E K E Q I F J
X R I A Y R B E U O N T R G Z S E M C N
A D V S I U A A C P A A E X I Z C E E I
Q Y C D Z D B C N T T I T F D L I H M R
X B A L Q U U D J F A B P J T R L W L Y
P E H W G N Z F U R X J I C H S H S T G
D X G A X L I A D A M Z D Z B Z C B T C
S W O O R T H O P T E R A L Y E H M H J
```

LIST OF WORDS

ENTOMOLOGY
HEAD
AQUATIC
COLEOPTERA
TRICOPTERA
ORTHOPTERA
PLANKTON
RELASTOMID
VIAL
ENTOMOLOGIST
THORAX
GILLS
HYMENOPTERA
HEMIPTERA
ODONATA
PREDACTIOUS
GERRIDAE
TWIZZERS
INSECTA
ABDOMEN
DIPTERA
LEPIDOPTERA
PLECOPTERA
EPHEMEROPTERA
GYRINIDAE
HALOBATES
METALPAN

education

AN APPLE FOR THE TEACHER

In the recent version, many new options are available. You can chose the direction you'd like particular words to run, (right to left) or place them in a particular spot. The last word you entered can be deleted or moved to a new location. Words can also be changed if so desired.

After completing your puzzle, simply type S for Save and the instructions will lead you through the process. You can save your puzzle on the program disk or on any initialized disk. Using initialized disks enables you to save as many puzzles as your heart desires.

Most teachers at one time or another have made matching tests for their students. Typing dittos has been an on-going responsibility. Again, Hi Tech's Word Match can save you valuable time. This program works about the same as Word Search. You select option 1, *Type in a new word list* and begin adding the terms you wish to include in your test. After completing this list, the words are displayed one by one along with instructions to type in the definition. Once all definitions are completed, they are randomly sorted and ready to save and print out.

As with Word Search, instructions lead you through the printing process and enable you to include the teacher's name, title of activity, student's name, date, and instructions for the students. Both programs also produce an answer key for the teacher's use.

I completed the mock example below in just a few minutes. The printouts are very professional looking, and of course the answer key is an added bonus.

Word Scrambler is much like Word Search only you generate a word list and a list of scrambled words. It would look something like this:

1. LUUSFE USEFUL

The words do not line up, providing a challenge in matching. The program is operated in the same manner as Word Search. It too may be of interest to educators in the classroom.

```
==========================================================
                                        DECEMBER 1, 1983
MR. SMITH
==========================================================

                        YOUR NAME.....................

ON THE DOTTED LINE, PLACE THE NUMBER OF THE DEFINITION WHICH BEST DESCRIBES
 EACH WORD.

                    ** AQUATIC INSECTS **

.... NOTONECTIDAE          1. THE STUDY OF INSECTS.
.... PLECOPTERA            2. THESE INSECTS LIVE ON THE WATER BUT DO
                              NOT USE GILLS TO BREATHE.
.... DIPTERA               3. COMMONLY KNOWN AS STONE FLIES. THEY
                              HAVE WORM-LIKE LARVA.
.... GERRIDAE              4. INSECTS WHICH DWELL ON OR IN THE WATER.
.... ENTOMOLOGY            5. COMMONLY KNOWN AS WATER STRIDERS. THEY
                              HAVE LONG SPINDLY LEGS.
.... BELESTOMIDS           6. THE LARGE GROUP WHICH GERRIDS AND
                              HALOBATES BELONG TO.
.... HEMIPTERA             7. THE LARGE WATER BEETLE. PICK UP FROM
                              BEHIND AS  BITING CAN OCCUR.
.... TRUE AQUATIC          8. LOOK ALIKE BEETLES WHICH SWIM ON THEIR
                              BACKS-THEY TOO CAN BITE.
.... AQUATIC INSECTS       9. THESE INSECTS BREATHE LIKE FISH
.... SEMI AQUATIC         10. COMMONLY KNOWN AS FLIES. THEY HAVE WORM
                              LIKE LARVA.
```

WORD ATTACK
davidson & associates
6069 Groveoak Place, #12
Rancho Palos Verdes, CA 90274
Copy protected
Replacement copy $10.00

Word Attack is a product which could be used to enhance language skills. All you need to use the programs is an Apple][+ with 48K of memory, a monitor or tv, and the program and data disk included with the manual.

The slow loading time between programs was the only complaint I had with this package. The other positive attributes made me overlook this shortcoming. There are nine levels for each program and three word lists for each level. You select the word list you wish to study by pressing the corresponding number.

1. Adjectives
2. Nouns
3. Verbs

You have a choice of sound effects and display in black and white or color. There are five separate exercises contained on the Data disk: Word display, Multiple choice quiz, Sentence completion, Word Attack, and Load a new word list. I shall attempt to mention a bit about each of the programs.

Word Display introduces the words in the lesson (you choose the level). A total of 25 words are displayed, followed by their synonyms and a sentence using the words correctly. It is advised that you repeat this lesson until you are familiar with each word and its meaning.

When you are confident that you know all the words from your lesson, move on to the next exercise, Multiple-Choice Quiz. With this exercise you have a choice of two modes: normal and inverse. Normal displays a word and you choose the meaning, inverse displays the meaning and you select the word. Take the test both ways and retake any words you miss until you get a perfect score. Then you will be ready for the next, harder lesson.

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Sentence Completion is what the name implies. You must recall the word, spell it correctly and place it in the supplied sentence. If you get stumped, press H for help and four words will be displayed. One of these words is the correct choice. You then simply type in the missing word. Sentence Completion is the most difficult exercise requiring adequate preparation from the other two exercises.

Word Attack reinforces your learning in a fun game activity. A meaning for a word appears at the bottom of the screen. Four boxed words appear at the top of the screen. Use the arrow keys to move the attacker so that it aims at the word which matches the definition, then use the Z key to fire. Occasionally various creatures will cross the screen, if you hit one along with the correct match, you receive bonus points. This game may be played at three speeds and a timer appears on the right of the screen letting you know how you are doing.

All in all, this package has a lot to offer. Besides the exercises I mentioned, the user may also type in a new word list. This can be a valuable asset to teachers who desire to expand the existing vocabulary this package provides.

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FIXES FOR THE APPLE //e DOS 3.3

Cecil Fretwell

AS most of you *IIe* users know, the new 80 column text card creates a few headaches. Two of my biggest headaches have been the fact that (1) I never check to see if the CAPS LOCK key is down when I boot the system and (2) I can not break the old habit of using PR#0 to return from using my printer.

The first headache usually occurs after either my wife or myself have been using Applewriter with the CAPS LOCK key up. Normally what happens is I boot DOS, forget to put the CAPS LOCK key down, and swear at the SYNTAX ERROR message after I enter my first DOS command.

The second headache is that the PR#0 after using the printer gets the 80 column screen all messed up with the result of having to issue a PR#3 to "unlock" the cursor after the PR#0 "locks" it.

I ran out of Excedrin and decided to investigate the possibility of avoiding these headaches. The results are reported in this article.

By way of introducing my fixes, consider the following HELLO program I use on my system:

```
10  HOME
20  T$ = "CECIL'S DOS 3.3 DISK
    FOR IIe"
30  IF PEEK(-1101) <> 6 THEN
    PRINT T$:END
40  PRINT CHR$(4);"PR#3"
50  PRINT T$
60  A = PEEK(1275)
70  IF A < 128 THEN POKE
    1275,A + 128
80  FOR I = 48351 TO 48351 + 24
90  READ J:POKE I,J
100 NEXT I
110 POKE 41516,223:
    POKE 41517,188
120 END
130 DATA 240,3,76,149,254
140 DATA 44,30,192,16,248
150 DATA 169,195,133,55
160 DATA 133,57,169,5,133,56
170 DATA 169,7,133,54,96
```

HELLO programs vary according to your needs so you can jazz up Lines 10 and 20 to whatever turns you on. I personally like a cleared screen that shows me what disk of the some 70 disks I have in the desired drive.

Line 30 insures that the program will work on an old][+. The new monitor ROM, referred to as the F8 ROM in the new literature, has a 6 stored in Location $FBB3. The old monitor ROM in the][+ has a $38 in this same location while the autostart ROM contains $EA. Thus, if the system is not a *IIe*, the sample program displays a title and quits.

For the *IIe*, the logic proceeds to Line 40. Line 40 activates the 80 column card which results in a cleared 80 column screen. This is a very important step because the ability to enter lower case commands depends upon the 80 column card being active. If you desire 40 column mode then insert a line immediately following Line 40 which reads as follows:

```
41 PRINT CHR$(17)
```

Line 50 places the desired title on the top line of the screen. The end result of this line of the DOS prompt,], on the third line of the screen.

Line 60 takes a peek at what is known as the mode byte for the 80 column logic. This byte is in Location $4FB. Turning Bit 7 of this byte on via the logic in Line 70 results in one being able to have the CAPS LOCK key up and still enter DOS commands. In fact, lower case characters entered for a command are automatically converted to upper case and displayed on the screen accordingly. This logic performs the uppercase restrict mode turned on via ESC R on the keyboard. You are correct if you say that you could accomplish the same thing by using ESC r or ESC R from the keyboard, however remember that pesky SYNTAX ERROR message with the wife needling you about making a mistake again.

Whether you turn Bit 7 on in the mode byte or use ESC R or ESC r from the keyboard, one of the nice features of the 80 column card active is that commands and key words come out in upper case even if you have the CAPS LOCK key up. When the system hits the double quote mark, ", it displays lower case and you must use the SHIFT key to get upper case. The next double quote mark switches back to converting lower case to upper case.

Lines 80 to 170 fix the pesky PR# problem. After identifying the problem in more detail, the corresponding assembly language program will be presented for purposes of discussion.

The *IIe* really has three screens. If the screen is in 40 column mode and the cursor is what Apple refers to as the checkerboard cursor, the 80 Column Text Card is inactive. This mode presents no problem if one uses PR#1 to get to the printer then uses PR#0 to get back to the screen.

Entering PR#3 activates the 80 column card with a resulting steady cursor (I personally wish it blinked). Now if you use PR#1 to use the printer then use PR#0 to get back to the screen, the cursor gets all fouled up. Even if one uses ESC 4 to get to the steady cursor 40 column mode, PR#0 seems to work after using the printer, but if one then switches back to 80 column mode using ESC 8, the cursor again gets fouled up. As near as I can tell, the problem arises in the fact that CSWL and KSWL, the hooks into the input/output logic, are not restored properly by PR#0. This is easily fixed as the following assembly language program shows.

First note where this code is located (the BASIC HELLO program given above places the code in the same place). Locations $BCDF–$BCFF are not used in both the DOS for the old][+ and the DOS for the *IIe*.

technical

FIXES FOR THE APPLE //e DOS 3.3

```
                        1
BCDF: F0 03             2       PRFIX   BEQ   PRFIX2    ;Is it PR#0?
BCE1: 4C 95 FE          3       PRFIX1  JMP   $FE95     ;No, use the F8 logic
BCE4: 2C 1E C0          4       PRFIX2  BIT   $C01E     ;80 col text card on?
BCE7: 10 F8             5               BPL   PRFIX1    ;If not, use F8 logic
BCE9: A9 C3             6               LDA   #$C3      ;Map into 80 col. card
BCEB: 85 37             7               STA   $37
BCED: 85 39             8               STA   $39
BCEF: A9 05             9               LDA   #5        ;Proper input hook
BCF1: 85 38            10               STA   $38
BCF3: A9 07            11               LDA   #7        ;Proper output kook
BCF5: 85 36            12               STA   $36
BCF7: 60               13               RTS             ;Back to DOS
```

Patchers beware, there are differences between the DOS for the old][+ and the DOS for the *II*e. If you don't like this area, copy it to a place that turns you on. Note that it is position independent, i.e., you can move the code without having to change its contents.

To activate this code, change location $A22C in DOS to the low order address of the code given above. DOS now has a $95 in this location. Change location $A22D to the high order address of the code given above. DOS now has a $FE in this location. This is the PR# logic in DOS.

The first thing to do is check on what type of PR# is being performed. If it is other than PR#0 then no "change" is made in DOS. The JMP to OUTPORT is what DOS used to do at location $A22B. If PR#0 is being performed, look at the BIT ALTCHR. ALTCHR is a softswitch which shows which character set is being used at the present time.

If Bit 7 of ALTCHR is off, this means that the checkerboard cursor is active. This is the "old][+ mode." It means that lower case characters are displayed in normal mode only and one is allowed to use the FLASH command in BASIC to flash upper case characters. If Bit 7 of ALTCHR is on, this is the only indication I can find to tell me whether the 80 Column Text Card is active. In passing, don't turn ALTCHR off if the 80 Column card is active nor turn ALTCHR on if the checkboard cursor is active unless you really know what you are doing. The screen can really get messed up.

Back to the code. If the checkerboard cursor is active, the logic proceeds as if DOS were not changed. In other words, the code performs the JMP to OUTPORT that DOS normally uses.

If the checkerboard cursor is not active, the 80 Column Text Card must be properly re-activated. The main reason that PR#0 won't work is that it sets up CSWL, CSWH to point to the COUT1 routine in the F8 ROM. This routine assumes checkerboard 40 column output, hence, with the 80 column softswitches active but no hooks into the 80 column firmware, the screen reverts to a weird mode. So we do our own "OUTPORT" by restoring CSWL, CSWH to hook into the 80 column firmware. The code also sets up KSWL, KSWH. This is not really necessary, just a precautionary measure. A normal return is then made to DOS.

Not all code is perfect, this code has a "flaw." If you deactivate the 80 Column card, e.g., use ESC [Ctrl-Q], the ability to use lower case characters in commands is also deactivated. There is no way to "patch" the PR#3 code to do an automatic ESC R because DOS performs the actual PR# initialization through the "back door". OUTPORT only sets up the hooks to the initialization code by making CSWL, CSWH point to the code. DOS's next step is to echo a character to the screen via CSWL, CSWH which invokes the initialization code which then sets up the final CSWL, CSWH to be used until the next PR# command. In its initialization process, the 80 column initialization code clears all but Bit 0 of the mode byte.

At the risk of sticking my neck out, the 80 column card version of 40 column mode supports all of the checkerboard 40 column mode plus more goodies. Therefore, why use the archaic checkerboard 40 column mode. One outstanding feature of the 80 column version of 40 column mode is that when one is in escape mode, an inverse plus (+) reminds you of this fact.

```
]LIST

10  REM

        SO WHAT DID
      YOU EXPECT ?

            BY  GEORGE
      A PLEAU

20  HOME : INVERSE :
      FOR I = 1 TO 40:H
      =  INT ((40 -
      I) / 2) + 1: VTAB
      12: HTAB H: PRINT
       SPC( I): NEXT
      : NORMAL : VTAB
      12: HTAB 9: PRINT
      "SO WHAT DID YOU
      EXPECT ?": VTAB
      23
```

technical

DOS CONTINUES FOLLOWING THIS INTERRUPTION . . .

O. J. Sizemore

IN an article by Cornelius Bongers (*Call -A.P.P.L.E.*, 1981) code was provided to relocate DOS to a 16K language card, thereby providing the user with an additional 10K of programming area when the card is not needed for other purposes. Since the language card overlays those addresses typically assigned to the on-board ROM, it was necessary to create a "jump table" (located at $BF00 through $BFFF) so the language card will be enabled prior to executing any DOS routines. Upon exiting these routines via the same jump table, the ROM is enabled and processing proceeds as usual. In most applications these changes are automatic and unnoticed by the user. There is, however, one type of application in which this creates a problem: interrupt handling.

Interrupts with DOS in RAM

Most operations which occur within the Apple are directed by software, provided either by the machine's ROM or the user. One notable exception is the effect of an external interrupt. This interrupt may be of two types: non-maskable or maskable. The occurrence of either type sets in motion a sequence of events which is initially dictated by the design of the 6502 processing chip rather than any type of software. It is only after these hardware events occur that the user may enter the sequence.

In the case of the Apple, the user must also wait until the ROM relinquishes control before they can enter the interrupt sequence. (While users most often take advantage of non-maskable interrupts by depressing the RESET key, the following discussion will focus on maskable interrupts, since it is this type which one most often desires to intercept).

Maskable interrupts are as such termed because they can be ignored (masked) if the user so desires. In fact, this is the default status following "power-up." To enable these interrupts, the user must execute the machine language instruction CLI (CLear Interrupt mask). From that point onward the 6502 will poll its maskable interrupt line, following the execution of every instruction.

If an interrupt is detected, the 6502 will automatically push the contents of the status register and both bytes of the program counter onto the stack. It will then execute an indirect jump via address $FFFF. That is, the contents of $FFFE and $FFFF will be used as the object (destination) of the jump. This is an area in the Apple's ROM which contains the values $40 and $FA, respectively; therefore, the processor is directed to location $FA40 (another location within the Apple's ROM).

At address $FA40, a routine is executed which saves the contents of the accumulator at location $45. The status register is then loaded into the accumulator, the "break" bit inspected and another indirect jump is executed. This time, however, the addresses involved reside in programmable memory, namely $3FE and $3FF.

It is at this point that the user has an opportunity to intercept the interrupt sequence, by storing the address of their interrupt handling routine (IHR) at $3FE and $3FF (low byte first). The default values at these locations are $65 and $FF and if the user does not change them the net effect is to direct the processor back to the ROM and ultimately halt processing.

In order to successfully handle interrupts, the user must provide two pieces of coding. The first is quite short and can be executed from BASIC by either BRUNing or by BLOADing and then CALLing. The purpose of this code is to place the address of the user's IHR in locations $3FE and $3FF and to enable the maskable interrupts. For example, if the IHR were to be located at $4000 the following code could be used:

```
A9 00       LDA #$00
8D FE 03    STA $3FE
A9 40       LDA #$40
8D FF 03    STA $3FF
58          CLI
60          RTS
```

The remaining task requires writing the actual interrupt handling routine and locating it at the address specified by the previous code. The content of the IHR will be largely dependent upon the device(s) generating the interrupt and how the user wishes to respond to it. One general rule, however, should be followed: save the contents of all registers prior to any other code and restore all registers prior to exiting. This will ensure that processing proceeds smoothly and logically following the interrupt.

There are two ways the user can save and restore the registers: 1) store them in a known location in memory and retrieve them prior to exiting, or 2) push them onto the stack. The first method can become rather complex if there are multiple devices capable of generating interrupts and/or devices are permitted to generate an interrupt during interrupt servicing. Using the latter method avoids this problem and gives the IHR the following structure:

→

technical

DOS CONTINUES

```
4000- A5 45     LDA $45
4002- 48        PHA
4003- 8A        TXA
4004- 48        PHA
4005- 98        TYA
4006- 48        PHA
4007            .
                .
                user-
                specific
                interrupt
                response
                .
                .
40FA- 68        PLA
40FB- A8        TAY
40FC- 68        PLA
40FD- AA        TAX
40FE- 68        PLA
40FF- 40        RTI
```

Before pushing the accumulator onto the stack, it must be loaded from $45. The ROM routine at $FA40 placed its contents there to prevent the pre-interrupt value from being lost when the status register was inspected. The X and Y registers must be pushed onto the stack via the accumulator since there are not direct commands for doing so (the same is true with regard to pulling them from the stack).

Finally, note that the routine ends with an RTI instruction, not an RTS. The RTI instruction causes the program counter and status register to be restored to their pre-interrupt values by pulling them from the stack. An RTS instruction will only pull the program counter. Since the pre-interrupt status register is now at the top of the stack, processing would resume at an unpredictable location.

Interrupts with DOS in the Language Card

If the language card containing DOS is enabled at the time of an interrupt, the program flow is more complex than detailed above and potentially troublesome. Remember that DOS is now accessed through the jump table located from $BF00 through $BFFF and that when DOS is operative, the ROM is disabled.

Since the initial response to an interrupt (pushing the status register and program counter onto the stack and jumping indirect via $FFFE) is dictated by the processing chip, the relocated DOS must contain valid addresses at $FFFE and $FFFF. Inspection of the relocated DOS reveals $8D and $BF in these locations.

This bit of planning then directs the processor back to the jump table via $BF8D. At that location the ROM is enabled by the instruction STA $C081, an indirect jump via $FFFE is executed, and processing proceeds as usual. If the user has not installed an IHR, no problems are encountered.

If they have installed an IHR, processing will proceed normally until the RTI instruction is encountered. At that point the status register and program counter are restored to their pre-interrupt values. Since DOS and ROM share addresses and the processor does not discriminate which was enabled prior to the interrupt, processing now begins at the wrong location (remember the jump table disabled DOS). Fortunately, this problem can be avoided with a small amount of coding.

Patching the Patch

In principle all that is necessary is to install a "check-byte" that can be set by the jump table and then inspect this byte just prior to executing the RTI instruction located in the users IHR. Assuming again that the IHR is located at $4000, this can be accomplished in the following manner:

1) To the code which enables interrupts and places the location of the users IHR in $3FE and $3FF add the following instruction:

```
A9 20       LDA #$20
8D 8D BF    STA $BF8D
A9 F4       LDA #$F4
            Over-write a
            section of
8D 8E BF    STA $BF8D
            the DOS jump
            table
A9 40       LDA #$40
8D 8F BF    STA $BF8F
A9 00       LDA -$00
            Set check
8D FF 40    STA $40FF
            byte to 0
```

Prior to these instructions the jump table looked like this:

```
$BF8D-8D 81 C0  STA $C081
$BF90-6C FE FF  JMP ($FFFE)
```

That code now reads:

```
$BF8D-20 F4 40  JRS $40F4
$BF90-6C FE FF  JMP ($FFFE)
```

Prior to following the normal interrupt route the processor will be intermediately routed to a user routine.

2) At location $40F4 install the following code:

```
40F4-48         PHA
40F5-A9 FF      LDA #$FF
                Set check byte
40F7-8D FF 40   STA $40FF
40FA-8D 81 C0   STA $C081
                Enable ROM
40FD-68         PLA
40FE-60         RTS
```

Two notes of importance about this code. First, the accumulator must contain the same value upon leaving as entering since the ROM coding has not had the opportunity to save it at $45; the PHA and PLA instructions ensure this. Second, the ROM must be enabled here since the JSR to this code replaced that instruction.

3) Prior to execution of the RTI instruction at the end of the users IHR, the 6502 registers should be restored to their pre-interrupt values. It is just ahead of these instructions that seven new instructions should be added to yield the following structure:

```
40DC-A7 FF 40   LDA $40FF
                Did interrupt
                occur
40DF-C9 FF      CMP #$FF
                with DOS
                enabled?
```

(continued on page 80)

technical

MOCKINGBOARD RESET MODIFICATION

Michael Mahon

THE Mockingboard is an Apple peripheral that's worth its weight in fun. I've enjoyed mine since the day I received it. The purpose of the Mockingboard is to make sounds — music, noise, and synthesized speech — but mine sometimes sounded off when I didn't expect it! The first case arose when I switched the Apple off and back on to boot out of one of those unfriendly protected programs. The boot proceeded normally — except for a high-pitched whine from the Mockingboard. Another power cycle usually fixed it, but the RESET key did not. Hmmmm.

The second manifestation was similar. I had been playing with the demo disk supplied with the Mockingboard, and it was chugging out a remarkably convincing train sound, when I decided to boot another disk with a RESET-PR#6 sequence. As before, the boot worked perfectly, but the "train" kept right on a-chuggin'!

Since this happened twice, I decided to take a look at the innards of the Mockingboard to see what was happening. I found that although the Apple's reset signal is routed to both 6522 VIA's, the Programmable Sound Generator chip (a General Instruments AY-3-8910) is not connected to the hard reset. The associated 6522 can reset the PSG, but only when the proper software incantation is performed. The result is that any time the PSG is commanded to produce a continuous sound, it will continue to do so under its own steam (so to speak) until stopped by appropriate software. The RESET key won't stop it.

Moreover, since General Instruments doesn't guarantee any particular power-up state for the PSG, it may occasionally power up in a "noisy" mode. They recommend a power-on reset to clear all PSG registers to zero and so ensure a quiet entrance. (This is not unusual. Most LSI chips require initialization, and "reset" is the signal for them to perform this internal housekeeping.)

So, what to do? The Apple's reset signal comes awfully close to the PSG's reset pin — all the way to pin 34 of the 6522 just below the PSG — so it shouldn't be too hard to get it the rest of the way. However, a wire is *not* the answer! We don't want the 6522 to try to reset the Apple whenever it resets the PSG! I, therefore, carefully soldered a IN4148 diode between the 6522's reset, pin 34, and pin 12 of the 6522 (pin 12 is already connected to the PSG's reset, pin 23). The cathode of the diode connects to pin 34, as shown in the accompanying figure. (If you're not comfortable soldering on delicate PC boards, ask a friend who is. Please, *DON'T* practice on your Mockingboard!) The diode allows the Apple's reset signal to reach the PSG while keeping the 6522's "reset PSG" signal from propagating back along the Apple reset line.

Since the Apple automatically generates a reset signal at power-on, you will be guaranteed sweet silence whenever you power up. And I think you will agree that it's appropriate to have the Apple's RESET key reset everything in sight — or hearing!

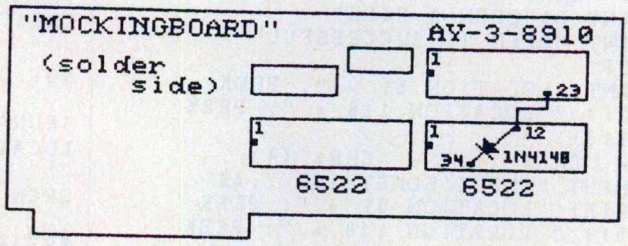

FIGURE 1

technical

TECHNIQUE NOTES

Ken Kashmarek/Call —A.P.P.L.E. staff writer

IN the January 1982 issue (page 33), Staff Writer Lee Reynolds offers some help on avoiding NOT DIRECT COMMAND. However, he probably put more effort into the technique than was really needed.

His method of modifying DOS is not necessary. By checking the code in DOS at $A65E, it can be determined that a check is being made for $FF at location 118 ($76) *or* a value of $DD at location 51 ($33). $FF indicates a direct (not deferred) command and $DD indicates Applesoft prompt. Note the *or* situation. This is contrary to what is stated in Beneath Apple DOS (Worth/Lechner, Quality Software, page 8–15).

Thus, instead of a DOS modification, we need only "POKE 51,6: POKE 118,0" to avoid the DOS error message. The value 6 POKEd into location 51 ($33) is the index of the RUN command in the DOS command table (entry points).

I determined the above after encountering an error when using CONT or GOTO as direct commands. CONT and GOTO do not clear the Applesoft prompt (], or $DD) from location 51. If either of these commands is used to start a program, and a DOS command is then issued by the program, the noble NOT DIRECT COMMAND message comes up (shown in listing). However, if INPUT is used prior to the DOS command, then the Applesoft prompt character at location 51 is changed. All works well in this situation.

If ONERR is active when this error condition occurs (location 51 contains $DD), then DOS does not put out any error message. Why? First of all, if ONERR is active, then messages are not produced. Second, if location 51 is $DD, then control is not passed to the program line reference in the ONERR command (because DOS thinks it is a direct command due to $DD in location 51). This is a catch-22 situation. Again, the bypass is POKE 51,6.

In the August 1982 *Call –A.P.P.L.E.* (page 40), C. Dorsman presents a technique for pausing a BASIC program and continuing execution via the RETURN command. There is a much simpler technique that does not require any machine language code or the ampersand vector. It is the STOP command. STOP is part of Applesoft and provides exactly the same capabilities as indicated in the technique article.

When STOP is executed, BREAK IN nnnn is displayed (nnnn is the line number). The CONT command will resume execution after the STOP command. Everything indicated in the technique article can take place after the BREAK message and before CONT.

The article as presented has several problems: 1) If CONT is used (instead of RETURN), the program immediately goes back to the pause message and adds another entry to the stack; 2) POKE 51,6 must be used after the pause in order to clear the Applesoft prompt prior to issuing DOS commands; and 3) The program defines COUT and $FDF0. This is actually COUT1, which does not use the KSWL/CSWL vectors. COUT is $FDED which puts the message out to a printer okay (if turned on).

```
]LIST

10  REM  DEMO LOCATION 51 & 118 F
     OR GOTO, CONT, AND RUN.
30  STOP
40  PRINT "LOCATION 51 = "; PEEK
     (51);" LOCATION 118 = "; PEEK
     (118)
45  D$ =  CHR$ (13) +  CHR$ (4)
50  PRINT D$"OPEN A FILE"
60  PRINT "OPEN IS SUCCESSFUL"
70  STOP
90  PRINT "LOCATION 51 = "; PEEK
     (51);" LOCATION 118 = "; PEEK
     (118)
95  D$ =  CHR$ (13) +  CHR$ (4)
100  INPUT "INPUT SOMETHING ";A$
110  PRINT "LOCATION 51 = "; PEEK
     (51);" LOCATION 118 = "; PEEK
     (118)
120  PRINT D$"OPEN A FILE"
130  PRINT "OPEN IS SUCCESSFUL"
140  END

]GOTO40
LOCATION 51 = 221 LOCATION 118 = 0

NOT DIRECT COMMAND

]RUN

BREAK IN 30
]CONT
LOCATION 51 = 221 LOCATION 118 = 0

NOT DIRECT COMMAND

]RUN40
LOCATION 51 = 6 LOCATION 118 = 0

OPEN IS SUCCESSFUL

BREAK IN 70
]CONT
LOCATION 51 = 221 LOCATION 118 = 0
INPUT SOMETHING HERE 'TIS
LOCATION 51 = 128 LOCATION 118 = 0

OPEN IS SUCCESSFUL
```

technical

TECHNIQUE NOTES

```
]LIST

10   REM  DEMO LOCATION 51 & 118 F
      OR GOTO, CONT, AND RUN.
20   REM  USE POKE 51,6
30   STOP
40   PRINT "LOCATION 51 = "; PEEK
      (51);" LOCATION 118 = "; PEEK
      (118)
42   POKE 51,6
45 D$ =  CHR$ (13) +  CHR$ (4)
50   PRINT D$"OPEN A FILE"
60   PRINT "OPEN IS SUCCESSFUL"
70   END

]GOTO40
LOCATION 51 = 221 LOCATION 118 = 0

OPEN IS SUCCESSFUL

]RUN

BREAK IN 30
]CONT
LOCATION 51 = 221 LOCATION 118 = 0

OPEN IS SUCCESSFUL
```

```
10   REM  DEMO LOCATION 51 & 118 F
      OR & PAUSE BY C. DORSMAN
30   &
40   PRINT "LOCATION 51 = "; PEEK
      (51);" LOCATION 118 = "; PEEK
      (118)
45 D$ =  CHR$ (13) +  CHR$ (4)
50   PRINT D$"OPEN A FILE"
60   PRINT "OPEN IS SUCCESSFUL"
70   END

]RUN
IN 30
RETURN
LOCATION 51 = 221 LOCATION 118 = 0

NOT DIRECT COMMAND

]CALL-151

*316:ED

*3D0G

]RUN

PAUSED IN 30
]RETURN
LOCATION 51 = 221 LOCATION 118 = 0

NOT DIRECT COMMAND
```

technical

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A Call —A.P.P.L.E. APPLE-CATION:

HI-RES SLIDE SHOW

Stowe Keller

IF you were interested in Clay Ruth's article, "Get the Most from a Diskette," March 1982 *Call -A.P.P.L.E.*, which involves modifying a diskette to open up more disk space, then this article may be for you. Herein I discuss a method of reducing DOS 3.3 from 10.5K to 2.5K bytes of RAM that can quickly store and retrieve sectors on disk.

By so doing, the user is left with 46K of usable RAM, and may use tracks 1–34 for up to 139K of disk storage. The user may also put a machine language routine, up to six sectors in length, on the end of track 0, and modify RWTS so as to load and execute that routine on boot-up.

To demonstrate the capabilities of such a customized disk, I will describe how to create a *Fast High-Res Slideshow* that can boot in three seconds and load 17 High-Res pictures in 19 seconds.

This article is intended for programmers familiar with machine language, using DOS 3.3 on a 48K machine. You will also need a "Disk Zap" utility that will read a specified sector, allow it to be edited, and will write it back to disk. (Quick Zapper, a simple Disk Zap program was published in the Oct. 1983 issue of *Call -A.P.P.L.E.)* Improper use of such utilities can destroy valuable data, so caution is advised.

Fast High-Res Slideshow will dedicate an entire disk to the storage of High-Res pictures. You will no longer be able to catalog the disk nor will you be able to store or retrieve files in the normal DOS 3.3 fashion. However, you may still use "COPY" or "COPYA" to make duplicates of the Slideshow.

Our goal with *Fast High-Res Slideshow* is to strip down and speed up DOS for the purpose of creating a disk that will boot the RWTS (READ/WRITE TRACK/SECTOR) routines, and load and execute a simple menu program. That menu program will allow individual or sequential retrieval of High-Res pictures.

But first, let us find out how many sectors are required to store an 8K High-Res picture, and research the behavior of DOS during boot-up.

With some simple figuring we find that an 8K byte High-Res picture occupies 32 pages of RAM (8192/256=32), which translates into 32 disk sectors. Those 32 sectors fit perfectly onto two 16-sector tracks.

By digging heavily into *Beneath Apple DOS*, we can unlock the secrets behind the booting process. Let us bear in mind that we want to free up as much disk space as possible; consequently, we shall eliminate those sections of DOS that we no longer need.

Beneath Apple DOS tells us that while booting a slave disk, the disk controller ROM loads in track 0, sector 0. That code, when executed, loads sectors 1 through 9 into memory at $B700-BFFF, and reloads track 0, sector 0 at $B600-B6FF.

This range of memory, from $B600 to $BFFF, contains RWTS and the boot 1 and 2 routines. (Not counting any routine we decide to add, this uses only 2.5K of RAM!)

Continuing with the boot-up process, we discover that control transfers indirectly to $B700, where RWTS is set up to read in the rest of DOS. But wait! We have already decided to eliminate as much of DOS as possible; do we really need such frills as a VTOC, directory, file names or file types? No. Our *Fast High-Res Slideshow* need only load binary images of known length (32 sectors) from known locations on disk (every two tracks) into known memory locations (High-Res page 1 or 2). We will study the next part of DOS even more closely, and see what we can turn to our advantage.

```
: A S M
                ********************************
2               *                              *
3               *    FAST HIGH-RES SLIDESHOW   *
4               *        by Stowe Keller       *
5               *                              *
6               * Call -A.P.P.L.E. : Dec. 1983 *
7               *                              *
                ********************************
9
10              *
11              *
12              FLAG    =       $06
13              TMP     =       $07
14              TMP1    =       $0E
15              CH      =       $24             ;Cursor horiz
16              A2L     =       $3E
17              IOB     =       $B7E8
18              GRSW    =       $C050
19              TXTSW   =       $C051
20              NOMIXSW =       $C052
21              PG1SW   =       $C054
22              HGRSW   =       $C057
23              HOME    =       $FC58
24              RDKEY   =       $FD0C
25              GETLN   =       $FD6A
26              COUT    =       $FDED
27              SETINV  =       $FE80
28              SETNORM =       $FE84
29              BELL    =       $FF3A
30              GETNUM  =       $FFA7
31              ZMODE   =       $FFC7
32              *
33                      ORG     $B400
34              *
```

technical

HI-RES SLIDE SHOW

At $B793, we discover a routine that will read or write a group of pages (sectors). One must specify a starting track and sector, a read or write command, a starting buffer in RAM, and the number of sectors to read or write. The routine will load the specified sector into the specified buffer, and load preceding sectors into descending pages of RAM. This seemingly backward approach takes advantage of sector skewing to minimize boot-up time. Normally, this routine would load 27 sectors in from disk, starting at track 2, sector 4, and location $B500, and would build down to track 0, sector $A, at $9B00.

Consider this: 1) By changing the appropriate pointers, we can load in a custom routine of our own, and thereby eliminate the unwanted parts of DOS by not loading them; 2) By storing a High-Res picture on two consecutive tracks, we can use the routine at $B793 to quickly and easily load our 32 sector picture(s); 3) Since we have opened up 27 sectors on disk by shortening DOS, and since we no longer need a directory, we may now use tracks 1, 2 and 17 for storing more High-Res pictures. This still leaves us with six sectors on track 0, at $A through $F, for our own routine. (However, our *Fast High-Res Slideshow* menu will only require two sectors.)

In summary: we can now shorten DOS 3.3 to RWTS, add our own short program to track 0, and use tracks 1-34 for storage. Our *Fast High-Res slideshow* will use these for storing 17 High-Res pictures. By using an existing routine in RWTS, we may easily load in a High-Res picture by instructing the routine to load 32 sectors, starting with track (2 * [PIC #]), sector $F, into the desired High-Res page.

```
B400: A9 00      35   INIT    LDA  #0
B402: 85 06      36            STA  FLAG        ;Clear options flag
B404: 8D EB B7   37            STA  IOB+3       ;Wildcard volume
B407: 20 58 FC   38   BEGIN    JSR  HOME        ;Clear screen
B40A: AD 51 C0   39            LDA  TXTSW       ;Text
B40D: AD 52 C0   40            LDA  NOMIXSW     ;Nomix
B410: AD 54 C0   41            LDA  PG1SW       ;P1
B413: A9 00      42            LDA  #0
B415: 85 48      43            STA  $48         ;Clear p-reg
B417: A9 12      44            LDA  #18
B419: 85 24      45            STA  CH          ;HTAB 18
B41B: 20 D6 B5   46            JSR  NRMPRT
B41E: CD C5 CE   47            ASC  "MENU"
B421: D5
B422: 8D 8D 00   48            HEX  8D8D00      ;Two c/r's  and terminator
B425: A9 05      49            LDA  #5
B427: 85 24      50            STA  CH
B429: 20 D6 B5   51            JSR  NRMPRT
B42C: B0 A9 A0   52            ASC  "0) SLIDESHOW"
B42F: D3 CC C9 C4 C5 D3 C8 CF
B437: D7
B438: 8D 00      53            HEX  8D00
B43A: A9 0A      54            LDA  #10
B43C: 85 24      55            STA  CH          ;Htab 10
B43E: 20 D6 B5   56            JSR  NRMPRT
B441: B1 A9 A0   57            ASC  "1) "
B444: 00         58            HEX  00
B445: 24 06      59            BIT  FLAG
B447: 30 03      60            BMI  N1          ;Branch if page flipping enabled
B449: 20 80 FE   61            JSR  SETINV      ;Else display active option in inverse
B44C: 20 D9 B5   62   N1       JSR  PRINT
B44F: CE CF A0   63            ASC  "NO FLIP"
B452: C6 CC C9 D0
B456: 00         64            HEX  00
B457: 20 D6 B5   65            JSR  NRMPRT
B45A: AF         66            ASC  "/"
B45B: 00         67            HEX  00
B45C: 24 06      68            BIT  FLAG
B45E: 10 03      69            BPL  N2          ;Branch if this option not active
B460: 20 80 FE   70            JSR  SETINV      ;Show active option in inverse
B463: 20 D9 B5   71   N2       JSR  PRINT
B466: C6 CC C9   72            ASC  "FLIP PAGES"
B469: D0 A0 D0 C1 C7 C5 D3
B470: 8D 00      73            HEX  8D00
B472: A9 0A      74            LDA  #10
B474: 85 24      75            STA  CH
B476: 20 D6 B5   76            JSR  NRMPRT
B479: B2 A9 A0   77            ASC  "2) "
```

technical

What our simple slideshow program offers is the ability to load all 17 High-Res pictures into memory in slideshow fashion, doing so in a manner controlled by two flags. The setting of these two flags is controlled from the menu. The first flag tells the slideshow to either load all High-Res pictures into the same High-Res page, visibly overwriting the current picture as the new one is loaded, or to load into alternate High-Res pages, keeping the current High-Res picture intact while loading the new one into the hidden page.

The second flag directs the slideshow to either advance automatically from one picture to the next, or to wait for a keypress between pictures. The currently active setting of the flags is displayed in inverse; each flags' condition is toggled by typing its menu number.

Another choice loads an individual picture by specifying its hex number, $1 - $11. A final menu choice will exit to BASIC.

Remember, if you want to use DOS 3.3 you will need to boot a DOS 3.3 disk.

Our machine language slideshow menu program occupies $B400-B5F7. The source code was developed on Glen Bredon's excellent Big Mac Assembler from A.P.P.L.E. It should translate easily to other assemblers.

The status of the two options, "NO FLIP/FLIP PAGES", and "AUTO ADV./KEY TO ADV.," are stored as the two uppermost bits of location $6 ("FLAG"). These two values are easy to test for with the 6502'S "BIT" instruction: Bit 7, representing the status of "NO FLIP/FLIP," is transferred to the negative ("N") flag, which may be tested with "BMI" or "BPL." Bit 6, representing "AUTO ADV./KEY TO ADV.," is transferred to the overflow ("V") flag, which may be tested with "BVC" or "BVS" instructions.

```
B47C: 00          78              HEX  00
B47D: 24 06       79              BIT  FLAG
B47F: 70 03       80              BVS  N3          ;Branch if this option not active
B481: 20 80 FE    81              JSR  SETINV      ;Show active option in inverse
B484: 20 D9 B5    82   N3         JSR  PRINT
B487: C1 D5 D4    83              ASC  "AUTO ADV."
B48A: CF A0 C1 C4 D6 AE
B490: 00          84              HEX  00
B491: 20 D6 B5    85              JSR  NRMPRT
B494: AF          86              ASC  "/"
B495: 00          87              HEX  00
B496: 24 06       88              BIT  FLAG
B498: 50 03       89              BVC  N4          ;Branch if this option not active
B49A: 20 80 FE    90              JSR  SETINV      ;Show active option in inverse
B49D: 20 D9 B5    91   N4         JSR  PRINT
B4A0: CB C5 D9    92              ASC  "KEY TO ADV."
B4A3: A0 D4 CF A0 C1 C4 D6 AE
B4AB: 8D 00       93              HEX  8D00
B4AD: A9 05       94              LDA  #5
B4AF: 85 24       95              STA  CH
B4B1: 20 D6 B5    96              JSR  NRMPRT
B4B4: B3 A9 A0    97              ASC  "3) LOAD A SINGLE PIC"
B4B7: CC CF C1 C4 A0 C1 A0 D3
B4BF: C9 CE C7 CC C5 A0 D0 C9
B4C7: C3
B4C8: 8D 00       98              HEX  8D00
B4CA: A9 05       99              LDA  #5
B4CC: 85 24       100             STA  CH
B4CE: 20 D9 B5    101             JSR  PRINT
B4D1: B4 A9 A0    102             ASC  "4) EXIT"
B4D4: C5 D8 C9 D4
B4D8: 8D 00       103             HEX  8D00
B4DA: A9 00       104             LDA  #0
B4DC: 85 24       105             STA  CH
B4DE: 20 D9 B5    106             JSR  PRINT
B4E1: D7 C8 C9    107             ASC  "WHICH?"
B4E4: C3 C8 BF
B4E7: 00          108             HEX  00
B4E8: 20 0C FD    109             JSR  RDKEY
B4EB: C9 B0       110             CMP  #"0"
B4ED: F0 79       111             BEQ  ZERO
B4EF: C9 B1       112             CMP  #"1"
B4F1: F0 15       113             BEQ  ONE
B4F3: C9 B2       114             CMP  #"2"
B4F5: F0 1A       115             BEQ  TWO
B4F7: C9 B3       116             CMP  #"3"
B4F9: F0 1F       117             BEQ  THREE
B4FB: C9 B4       118             CMP  #"4"
B4FD: F0 06       119             BEQ  FOUR
B4FF: 20 3A FF    120  BEEP       JSR  BELL        ;No match, indicate error
B502: 4C 07 B4    121             JMP  BEGIN       ;Go back and try again
                  122  *
```

technical

HI-RES SLIDE SHOW

Slideshow menu initializes these two bits to zero, yielding "NO FLIP" and "AUTO ADV." as the default for the slideshow sequence. Starting with $B407, the slideshow program clears and displays the text screen, and proceeds to print out the menu, using Andy Hertzfeld's print routine from Big Mac. Note how location $6 ("FLAG") is tested to determine which settings should be shown in inverse text. The flags are indented since they serve as qualifiers to "0) SLIDESHOW." Choices 3,4 and the prompt are always printed the same.

At $B4E8 we make use of the monitor's "RDKEY" routine to obtain the user's choice. The character entered is tested against the ASCII values "0" through "4." If no match is found, a beep is generated and the menu is displayed again. If a match is found, control transfers to the appropriate part of the program.

Choice 4, "EXIT," is most easily processed; it coldstarts BASIC with a JMP $E000.

Choices 1 and 2 toggle their respective flags by flipping the appropriate bit in location $6 with the "EOR" instruction.

Choice 3, loads a single picture, prompts the user for the desired picture number in hex, from $1 to $11 inclusive. The menu program will beep and restart if an incorrect value is entered. If an acceptable value is obtained, the High-Res screen will be displayed, and the picture number will be multiplied by two to obtain the starting track number. The 32 sectors of our desired picture will be loaded into High-Res page 1, using the routine at $B793. The program will wait for a keypress before returning to the menu.

```
B505: 4C 00 E0   123  FOUR     JMP  $E000       ;Exit to BASIC
                 124  *
B508: A5 06      125  ONE      LDA  FLAG        ;Flip/no flip pages
B50A: 49 80      126           EOR  #$80        ;Toggle bit 7
B50C: 85 06      127           STA  FLAG
B50E: 4C 07 B4   128           JMP  BEGIN
                 129  *
B511: A5 06      130  TWO      LDA  FLAG        ;Auto adv/key
B513: 49 40      131           EOR  #$40        ;Toggle bit 6
B515: 85 06      132           STA  FLAG
B517: 4C 07 B4   133           JMP  BEGIN
                 134  * ----------------------
B51A: 20 D6 B5   135  THREE    JSR  NRMPRT      ;Load single pic:
B51D: 8D         136           HEX  8D
B51E: D0 C9 C3   137           ASC  "PICTURE #$"
B521: D4 D5 D2 C5 A0 A3 A4
B528: 00         138           HEX  00
B529: 20 6F FD   139           JSR  GETLN+5     ;Monitor input routine without prompt
B52C: E0 00      140           CPX  #0
B52E: D0 03      141           BNE  R31
B530: 4C 07 B4   142           JMP  BEGIN       ;Abort
                 143  *
B533: 20 C7 FF   144  R31      JSR  ZMODE       ;Initialize for hex input
B536: 20 A7 FF   145           JSR  GETNUM      ;Clear aA,then get chr from kbd
B539: A5 3E      146           LDA  A2L
B53B: F0 C2      147           BEQ  BEEP
B53D: 30 C0      148           BMI  BEEP        ;Error if negative
B53F: C9 12      149           CMP  #18         ;Is it out of range?
B541: 10 BC      150           BPL  BEEP        ;Yes, beep for error and goto begin
B543: 2C 50 C0   151           BIT  GRSW        ;Softswitch
B546: 2C 54 C0   152           BIT  PG1SW       ;Softswitch
B549: 2C 57 C0   153           BIT  HGRSW       ;Softswitch
B54C: 0A         154           ASL              ;Multiply pic # by 2 for track #
B54D: 8D EC B7   155           STA  IOB+4       ;Track
B550: A9 0F      156           LDA  #$0F
B552: 8D ED B7   157           STA  IOB+5       ;Sector
B555: A9 3F      158           LDA  #$3F
B557: 8D F1 B7   159           STA  IOB+9       ;Buffer
B55A: A9 20      160           LDA  #$20        ;# of sectors to read
B55C: 8D E1 B7   161           STA  $B7E1
B55F: 20 93 B7   162           JSR  $B793       ;R/w a group of pages
B562: 20 0C FD   163           JSR  RDKEY       ;Wait for keypress
B565: 4C 07 B4   164           JMP  BEGIN
                 165  * --------------------
B568: A9 22      166  ZERO     LDA  #34         ;Slideshow:
B56A: 85 08      167           STA  $08
B56C: A9 5F      168           LDA  #$5F        ;Pt to p2
B56E: 8D F1 B7   169           STA  IOB+9       ;Buffer
B571: 85 0A      170           STA  $0A         ;Keep track of page
B573: A9 00      171           LDA  #0
B575: 85 09      172           STA  $09
```

technical

Choice zero, SLIDESHOW, loads all 17 High-Res pictures into memory, one after another, starting at number 17 and working down to number 1. The setting of choice 1 will determine whether each picture is loaded into the same High-Res page, or into alternate High-Res pages. The setting of choice 2 determines whether the program advances automatically from one picture to the next, or waits for a keypress before advancing. Slideshow finishes when it reaches track 0, and waits for a keypress before returning to the menu.

```
B577: 24 06        173
B579: 10 05        174
B57B: E6 09        175
B57D: 4C 9B B5     176
                   177  *
B580: E6 08        178  R00
B582: E6 08        179
B584: AD 50 C0     180  R01
B587: AD 57 C0     181
B58A: A2 01        182
B58C: 24 06        183
B58E: 10 07        184
B590: A5 09        185
B592: 49 01        186
B594: 85 09        187
B596: AA           188
B597: C6 08        189  R02
B599: C6 08        190
B59B: BD 54 C0     191  R021
B59E: A5 08        192
B5A0: 8D EC B7     193
B5A3: A9 0F        194
B5A5: 8D ED B7     195
B5A8: A9 20        196
B5AA: 8D E1 B7     197
B5AD: A5 0A        198
B5AF: 24 06        199
B5B1: 10 04        200
B5B3: 49 60        201
B5B5: 85 0A        202
B5B7: 8D F1 B7     203  R03
B5BA: 20 93 B7     204
B5BD: 24 06        205  R035
B5BF: 50 03        206
B5C1: 20 0C FD     207
B5C4: AD EC B7     208  R04
B5C7: D0 BB        209
B5C9: 24 06        210
B5CB: 10 03        211
B5CD: AD 54 C0     212
B5D0: 20 0C FD     213  R05
B5D3: 4C 07 B4     214
                   215  * ----------------
                   216  *
B5D6: 20 84 FE     217  NRMPRT   JSR  SETNORM    ;Normal text
                   218  * String print by Andy Hertzfeld: Software Wizard
                   219  * Pull return address off stack, and print the data following
                   220  * That address as ASCII characters until a hex 00 is found.
                   221  * Push the adjusted return address on the stack and RTS.
B5D9: 68           222  PRINT    PLA
B5DA: 85 0E        223           STA  TMP1
B5DC: 68           224           PLA
B5DD: 85 0F        225           STA  TMP1+1
B5DF: A0 00        226           LDY  #0
```

Starting with an unmodified slave DOS 3.3 diskette, preferably blank, you must make the following changes in order to create a *Fast High-Res Slideshow* disk. Remember, you will need a Disk Zap utility for changing sectors on disk. You may then use the BASIC program in listing 2 to BLOAD pictures from a normal disk and transfer them onto the *Fast High-Res Slideshow* disk.

With your Disk Zap utility, read in track 0, sector 1. This sector is normally loaded into $B700-B7FF, but your utility will have to load it lower in memory. I will refer to this location as $XX00.

```
BIT   FLAG
BPL   R00          ;Branch if not flipping pages
INC   $09          ;Set flag for 'flip'
JMP   R021         ;Dont display hires until first pic
                                                  loaded
INC   $08
INC   $08
LDA   GRSW         ;GR
LDA   HGRSW        ;Hires
LDX   #1
BIT   FLAG
BPL   R02          ;Branch if not flipping pages
LDA   $09          ;Else toggle flag for displaying
EOR   #$01         ;      Page one or two:
STA   $09
TAX
DEC   $08
DEC   $08
LDA   PG1SW,X      ;Show prim. or sec. page
LDA   $08
STA   IOB+4        ;Tr
LDA   #$0F
STA   IOB+5        ;Sector
LDA   #$20
STA   $B7E1        ;# of pages to r/w
LDA   $0A
BIT   FLAG
BPL   R03          ;Branch if not flipping pages
EOR   #$60         ;Else toggle buffer adr
STA   $0A
STA   IOB+9        ;Buffer
JSR   $B793        ;R/w a group of pages
BIT   FLAG
BVC   R04          ;Branch if auto advance
JSR   RDKEY        ;Else wait for keypress
LDA   IOB+4        ;Tr
BNE   R01          ;Quit when tr=0
BIT   FLAG
BPL   R05          ;Branch if not flipping pages
LDA   PG1SW        ;Else show last pic
JSR   RDKEY        ;Wait for keypress
JMP   BEGIN
```

The two bytes at $XX48 and $XX49 contain 84 9D (lo-order, hi-order), which is the entry point to DOS coldstart. Change these to 00 B4, which is the entry for the *Fast High-Res Slideshow.*

The track number of the second stage boot (normally 01) is found at $XX15, change it to 00. The sector number of the second stage boot (normally 04) is found at $XX1A, change it to 0F.

Location $XXE0 contains the number of pages in the second DOS load. Change it from 1B to 02. (The *Fast High-Res Slideshow* is two sectors long.) Change $XXE3 from 1B to 01.

—●→

technical

HI-RES SLIDE SHOW

Now, write this sector back onto track 0, sector 1.

Place the first 256 bytes of our slideshow menu program into your Disk Zap buffer, and write it onto track 0, sector E. Enter the remainder of slideshow menu and write it onto track 0, sector F.

All that is left is to place 17 High-Res pictures onto your disk, and your *Fast High-Res Slideshow* is complete.

Modifications:

The reader is encouraged to use their imagination in applying the techniques described in this article. One need not be limited to High-Res pictures, or even binary images for that matter. One could load and run a BASIC program, provided the boot-up routine sets the proper pointers in zero page. One could go so far as to write one's own custom DOS and include only those features deemed necessary for an application. The possibilities are endless.

```
B5E1: E6 0E      227  LOOP      INC  TMP1
B5E3: D0 02      228             BNE  SKIPADD
B5E5: E6 0F      229             INC  TMP1+1
B5E7: B1 0E      230  SKIPADD   LDA  (TMP1),Y
B5E9: F0 06      231             BEQ  PUTADD
B5EB: 20 ED FD   232             JSR  COUT
B5EE: 4C E1 B5   233             JMP  LOOP
B5F1: A5 0F      234  PUTADD    LDA  TMP1+1
B5F3: 48         235             PHA
B5F4: A5 0E      236             LDA  TMP1
B5F6: 48         237             PHA
B5F7: 60         238             RTS
--End assembly,
504 bytes, Errors: 0
```

References

- *Apple II Reference Manual,* by Chris Espinosa, Apple Computer Inc., Cupertino, California, 1979.
- *Beneath Apple DOS,* by Don Worth and Pieter Lechner, Quality Software, Reseda, California, 1982. Available from A.P.P.L.E. to members only.
- *Apple II Monitors Peeled,* by William E. Dougherty, Apple Computer Inc., Cupertino, California, 1981.
- *Apple II DOS Manual,* Anonymous, Apple Computer Inc., Cupertino, California, 1980.


```
]LIST

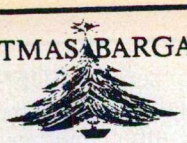
5  REM

DOS 3.3 TO SLIDESHOW
    PIC TRANSFER

 STOWE KELLER :
     CALL -A.P.P.L.E.
10 D$ =  CHR$ (4)
15  GOSUB 1000
20  TEXT : PRINT "INSERT DOS 3.3
     DISK WITH DESIRED PICTURE:"
30  INPUT "NAME OF PICTURE TO TRANSFER?";N$
40  HGR : PRINT D$"BLOAD"N$",A$2000"
50  TEXT : PRINT "INSERT FAST HIR
     ES SLIDESHOW DISK:"
60  INPUT "PICTURE # TO SAVE UNDER?";N
70  IF N < 1 OR N > 17 OR N <  > INT (N) THEN
80 N2 = 2 * N: REM TRACK #
90  POKE 6,N2
100  CALL 768
110  GOTO 20
1000 HEX$ = "300:A5 06 8D EC B7 A
     9 0F 8D ED B7 A9 3F 8D F1 B7
      A9 20 8D E1 B7 A9 02 8D F4
     B7 A9 00 8D EB B7 20 93 B7 6
     0 N D9C6G"
1010 L =  LEN (HEX$): FOR I = 1 TO
     L: POKE 511 + I, ASC ( MID$
     (HEX$,I)) + 128: NEXT : POKE
     72,0: CALL  - 144
1020  RETURN
```

technical

CHRISTMAS BARGAINS



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EXPLOITING TASC

Sam F. Vass

FIRST we should explain why and when to use a compiler. A compiler changes interpreted BASIC into assembly language allowing it to execute much faster. This reduces dependence upon assembly language routines and fancy use of BASIC to achieve speed. Programming is simplified. Any program should be compiled only after thorough testing of the interpreted version. Debugging is much simpler.

TASC (The Applesoft Compiler), provided by Microsoft, generates source code and statistics during compilation which should be printed by turning on the printer prior to running TASC. Serious use of a compiler and/or analysis of its inner workings requires preservation of this data. The source code is a listing of the Applesoft program being compiled. The statistics include memory locations for the object code and the runtime library. Variable location is separately specified.

Appendix F of the user manual identifies pointers in zero page of memory. These pointers identify program and variable type location. If a variable type is not used, then its pointer may be set to $803. If one wishes to determine the initial setting of a pointer, then that data may be obtained from the first "line" of object code. The first function of an executing program is to set these pointers from data contained within the first line.

Usage Notes

TASC requires integers to be used for peeks, pokes, and speed; however its range is from −32768 to +32767. To convert the high byte of a memory location the following subroutine should prove useful.

```
10  HIGH = X: IF HIGH > 127
    THEN HIGH = 256 - HIGH
20  INTEGER = LOW + 256 *
    HIGH
```

Input Nearly Anything (*Call -A.P.P.L.E.:* All About Applesoft) is a useful routine that allows INPUT statements to contain leading quotation marks and internal commas. Unfortunately, the TASC Compiler does not store strings in the same manner as the Applesoft Interpreter. Therefore, the routine will not work. A simple modification allows the routine to function if we can find the string pointers. We will explore both a new Input Nearly Anything routine and finding string pointers in a compiled program.

Listing 1

```
:ASM

                        1    NXTCHAR  =    $FD75
                        2             ORG   $300
                        3    *
0300: A2 00             4             LDX   #$0
0302: 20 75 FD          5             JSR   NXTCHAR     ;Returns with X as string length
0305: E0 00             6             CPX   #$0
0307: F0 2F             7             BEQ   RTN
0309: 86 1A             8             STX   $1A
030B: A0 00             9             LDY   #$0
030D: BD FF 01         10    LOAD     LDA   $1FF,X      ;Load input character
0310: 29 7F            11             AND   #$7F        ;Clear high bit
0312: 91 6F            12             STA   ($6F),Y     ;Store character
0314: C6 6F            13             DEC   $6F
0316: A9 FF            14             LDA   #$FF
0318: C5 6F            15             CMP   $6F
031A: D0 02            16             BNE   *+4
031C: C6 70            17             DEC   $70
031E: CA               18             DEX
031F: D0 EC            19             BNE   LOAD        ;Are we thru?
0321: A5 1A            20             LDA   $1A
0323: 91 6F            21             STA   ($6F),Y     ;Save length
0325: A5 6F            22             LDA   $6F
0327: 91 1B            23             STA   ($1B),Y     ;Save pointer low byte
0329: C8               24             INY
032A: A5 70            25             LDA   $70
032C: 91 1B            26             STA   ($1B),Y     ;Save pointer high bytye
032E: C6 6F            27             DEC   $6F
0330: A9 FF            28             LDA   #$FF
0332: C5 6F            29             CMP   $6F
0334: D0 02            30             BNE   RTN
0336: C6 70            31             DEC   $70
0338: 60               32    RTN      RTS

--End assembly--     57 bytes      Errors: 0
```

technical

EXPLOITING TASC

An input routine must start with a routine accepting normal input, accepting cursor moves, reacting to back and forward space commands, and terminating with a return. The standard routine is at $FD75. This should be followed by clearing the high bit, storing the string and setting the pointers. TASC stores its strings using the same pointer to memory as the interpreter at $6F and $70. However, after moving the string, it stores the length as an additional byte preceding the string. The new subroutine then stores the pointers in the location identified in $1B and $1C (low byte first). Listing 1 provides the full assembly language input routine. Now to identify the locations to be inserted into $1B and $1C, we have to explore the compiler.

Finding Pointers

The Applesoft interpreter stores the names of variables and pointers to their location while TASC stores only the latter. Furthermore this location of a pointer is established during compilation; therefore, it cannot be found by any interpreter routine. The string pointer can be found by examining a compiled program, inserting the correct location, and recompiling or by inserting a find routine within the code to do the job each time the program is run. Let us look at a simple example of the latter. It should be applicable in principle to any compiler.

Pointers

7D.7E END OF LOCAL NUMERIC VARIABLES
6F.70 BOTTOM OF STRING STORAGE SPACE MINUS ONE
7F.80 END OF LOCAL STRING POINTER STORAGE
3F6.3F7 BEGINNING OF OBJECT CODE

Using these pointers, the area to be searched can be limited, but there is one consideration. Any string defined within a program is contained within the program in line number order, thus further reducing the search area if a string is defined in the opening line.

Compiling and running this routine demonstrates the principles of the modified input routine. Non array pointers are stored first immediately following local numeric variable storage with string array pointers stored next. All pointers are in line number order.

Listing 2

```
]LIST

5  REM

  TASC TEST : SAM F VASS

CALL -A.P.P.L.E. : Dec. 1983

10  DIM A$(3),B$(3)
20 A$(0) = "DOG":B$(0) = "CAT":C$
     = "ANT"
30 AD = 1014: GOSUB 910:PO(1) = A
   D
40 AD = 125: GOSUB 910:PO(2) = AD

50 AD = 127: GOSUB 910:PO(3) = AD

100  REM * FIND STRING *
110  FOR I = PO(1) TO PO(2)
120  IF  PEEK (I) = 3 AND  PEEK (
     I + 1) = 68 AND  PEEK (I + 2
     ) = 79 AND  PEEK (I + 3) = 7
     1 THEN C = I:I = PO(2)
130  NEXT
140  IF C = 0 THEN  PRINT "DOG NO
     T FOUND": END
150 B =  INT (C / 256):D = C - B *
     256: REM HIGH AND LOW BYTES
200  REM * FIND POINTER TO "DOG"
     *
210  FOR I = PO(2) TO PO(3)
220  IF  PEEK (I) = D AND  PEEK (
     I + 1) = B THEN E = I:I = PO
     (3)
230  NEXT
240  IF E = 0 THEN  PRINT "POINTE
     R NOT FOUND": END
250 F =  INT (E / 256):G = E - F *
     256
300  REM * INPUT A$(0) *
310  POKE 27,G: POKE 28,F: REM *
     SET POINTERS *
320  PRINT "TEST INPUT A$(0) ";
330  CALL 768
340 Q =  PEEK (27) + 2:R =  PEEK
     (28): IF Q > 255 THEN R = R +
     1:Q = Q - 256
350  POKE 27,Q: POKE 28,R
360  PRINT "TEST INPUT A$(1) ";
370  CALL 768
400  REM * TWO MORE EXAMPLES *
410 H = E + 4 * 2: REM  POINTERS
     TO B$(0) FOLLOW A$(0)
420  POKE 28, INT (H / 256): POKE
     27,H - 256 *  PEEK (28)
430  PRINT "TEST INPUT B$(0) ";
440  CALL 768
450 N = PO(2) + 1: POKE 28, INT (
     N / 256): POKE 27,N - 256 *
      PEEK (28)
460  PRINT "TEST INPUT C$ ";
470  CALL 768
500  REM * DEMONSTRATION *
510  PRINT A$(0)
520  PRINT A$(1)
530  PRINT B$(0)
540  PRINT C$
550  END
900  REM * FIND ADDRESS *
910 P1 =  PEEK (AD):P2 =  PEEK (A
     D + 1)
920  IF P2 > 127 THEN P2 = 256 -
     P2: REM MAKE AN INTEGER
930 AD = 256 * P2 + P1
940  RETURN
```

technical

Passwords

An interesting by-product for this technique is adding passwords to to protect programs and data. Delete lines 300 through 550 of the program above and enter the new lines below.

The algorithm used in line 370 requires each letter to be "I" greater than the one stored in memory. Since A$(0) is "DOG," the password is EQJ. Any algorithm may be used, its decoding after compilation is complex, as the password is not stored in memory or in the object code.

Conclusion

The proper use of these routines allow the BASIC programmer to take advantage of a universal input routine while forcing a more structured approach to programming. The opening lines of a program should dimension all string arrays and identify all other strings to force a known order for pointers. By the way this routine does accept leading spaces for inputs and inputs consisting of nothing but spaces.

Listing 3

```
300  REM PASSWORD
310 PA = 0: HOME
320 N = PO(2) + 1: POKE
      28, INT (N / 256):
      POKE 27,N - 256
      * PEEK (28):
      REM C$
330  PRINT "ENTER PASSWORD
     ";: CALL 768
340  IF  LEN (C$) <
       > LEN (A$(0))
     THEN 300
350  FOR I = 1 TO  LEN
     (C$)
360  IF  ASC ( MID$
     (C$,I,1)) + I
     (  )  ASC ( MID$
     (A$(0),I,1)) THEN
     PA = 1
370  NEXT
380  IF PA = 1 THEN
     300: REM
WRONG PASSWORD
```

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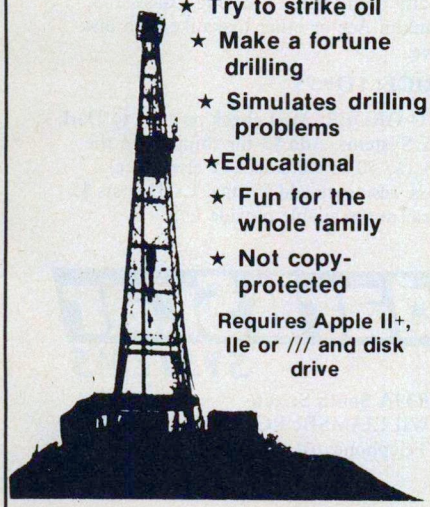

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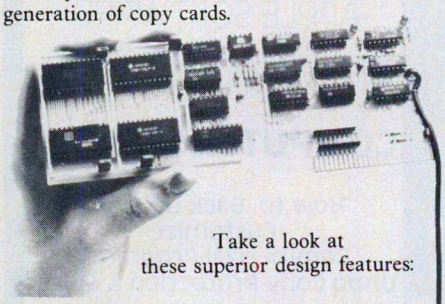

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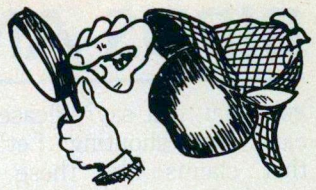
THE BIRDS AND THE BEES: GENETIC ENGINEERING (Part 3)

Rick Sutcliffe/Call —A.P.P.L.E. staff writer



IN the preceding two issues, the *Northern Spy* has offered a few words on the history of the Apple][and some of its clones. We found that in order to be legally different and to also accommodate different operating system requirements, modifications must be made to the F8 monitor ROM, as we shall see.

To illustrate a problem which can arise because of the different character sets, consider the LIST command. In full Apple emulation mode, everything works normally. But in FP80 mode the differing screen characters (normal has the high bit clear) mean that there are several patches to Applesoft contained in the Basis preboot. When LIST is outputting a token and it arrives at its last letter (which has the high bit set) it cannot output it "straight" as have been the previous characters or that particular letter will then appear on the screen in inverse. So, at D75F, instead of another JSR DB5C (ordinary output) we have instead JSR F1CB at which latter location we have the patch:

AND#$7F; turn high bit back off
JMP OUTDO; then output it.

There are other differences at numerous locations, including patches in the locations ordinarily used for tape I/O. So if you use such routines, or copy portions of them in your own programs, be wary — you could fall into a serious trap.

An annoying problem with part of the Autostart revisions turned up with the routine BL1 at FE00 in the Apple. In the revised Basis code (in FP80 mode) BL1 starts at FE01. Ouch! I got around this one by replacing a JSR FE00 with JSR TOBL1 where TOBL1 is JMP($FEF7) and I solved the previous problem by replacing JSR DB5C with JSR TOOUTDOA where TOOUTDOA is JMP($D760). That is, we do an indirect jump to the contents of a memory location which we know contains the address of the desired routine in both machines. Then our code always works correctly, regardless of where it finds itself.

What is the point of all this detail? With it, we illustrate the inevitable pitfalls in modifying system code. Someone else may have calls to those routines which will now no longer work. On the other hand, in AMPER-MANAGER, I was calling over a hundred addresses in ROM and these were the only ones I had trouble with, so the adaptation is generally satisfactory.

The other problem, of incompatibility with the *IIe* on firmware switches, is more serious. There is no way around this, and purchasers of the Basis will just have to live with it. The bottom line here is an 8.5 on innovation, a 9.5 on reliability, a 9 for the keyboard and an 8 for faithfulness. We've got a great machine here; there are some risks associated with it for some of us, and it is better with a hacker than a user — but much, much more satisfying to work with than the cheap imitations or even than the slightly upgraded ACE.

In the same category, but as a direct descendant rather than as a flattering admirer, is our new friend, the *IIe*. Much has been said and written already about this machine, and plenty of that has been in this very space. Let's confine ourselves to a comparison with the Basis, as the others are not in the same league.

The keyboard is not as extensive as the Basis, though it has a much nicer touch. It duplicates the ACE case reversal on the square bracket key, which the Basis does not. It likewise may require three keys for a reset, and has more extensive diagnostics as well as an easier and more logical shift-lock arrangement. The *IIe* uses the alternate 64K bank of RAM to implement the 80-column feature — instead of an entirely separate set of static RAM as on the Basis. As noted, the firmware switches are arranged quite differently. You cannot switch alternate RAM in banks, but you can read the status of all the firmware switches — a feat not possible on any of the others, including the plus.

Apple chose to patch the monitor to a new set of "extension" ROM in the CXXX range of memory which can be switched in and utilized at any time. Extensive use of large-scale integrated circuits has reduced the chip count dramatically; I doubt that even a fully loaded *IIe* will need a fan. Finally, the changes in ROM have been done so very carefully (and with a few traps for pirates!) that it would be virtually impossible to create a program on the plus which will not run on the *IIe*. (The reverse is of course not true at all.)

Give Apple a 9 on innovation (they invented the thing, but I won't give a ten because they could have improved it more — see the June and July columns), a 9.8 on faithfulness, a 9 on ease of use, but only a 7 for the keyboard (nice feel to it, but paying an extra $250 for a keypad is ludicrous — it could have been included for next to nothing).

What should you buy? Well first, forget the clones — why throw your money away? If you want an el-cheapo, buy a $40 board and build your own. Don't forget to buy a legitimate copy of the ROM code on a legal 3.3 master before burning it — then you don't really owe anybody a thing — but do not then start selling or giving away copies to your friends. (I have some qualms even about this advice, but it beats filling the pockets of thieves or of becoming one yourself.) The Franklin has some merits, particularly for the keypad — but I personally don't like their corporate attitude.

They may get away with pirating designs and software legally, but the moral and ethical issues will not go away. They have stolen and mass produced Apple's ROM code; there is no lighter word than theft for what they have done even if the courts cannot find a way to convict them. And, what do you say about a company whose agents are instructed (I have a copy!) to disparage the *IIe* to prospects by telling them that "Franklin (is) a market leader, not a 'me too' like the 2e" and "more compatible with Apple software than 2e"? Eh,

—◉→

BIRDS AND BEES

vot's dat you say? Please, my poor ears. Stop shouting. Let's just say that claims like these are...are ...gimme a month or two and I'll think of a word.

And the Basis? If the *//*e were not available (and with three month delays, one wonders), this would be the best thing on chips. I like their engineers' implementation of some of the extensions better than Apple's, and the price is quite good for a loaded machine.

For me, it's a tough decision — I did like the Basis — but I have to give the overall edge to the *//*e — and a major part of my reason is that by its very lineage it already has the established place as the market leader — something the Basis cannot claim and likely will not get. Now if I could only get the *//*e with a Basis keyboard and the other built-ins. Oh drool!

The chart which follows provides a summary comparison of the machines tested with ratings on a scale of ten for the various categories — including several not mentioned in the text.

I should comment briefly on the disk drives provided with the machines. Apple's Disk][has been an unappreciated technical marvel. Though now somewhat short on storage space, it has been a solid and reliable workhorse, and was ahead of its time when Apple first brought it out.

Two machines came with RANA drives, including the Franklin (they now have their own — the Ace 10 — which seems to be a μ-Sci). This drive features slightly larger storage space, a 4-drive controller and a supposedly more reliable mechanism. I cannot comment on the latter; one would have to run it for a year or so. DOS must be patched to use the extra storage and four drives, and the patch is provided. There is also a write-protect switch which can be manually set on the front of the drive or toggled at $C083 + X (ON) $C082 + (OFF). These drives seem durable and well made; my only negative comments are that they are slightly noisy and slightly expensive.

As noted earlier, the Basis came with μ-Sci drives, which are somewhat cheaper than Apple's, but otherwise functionally equivalent except for one thing. The access time was sufficiently slow so that any program which strains the system by swapping drives a lot to copy sector-by-sector will crash and destroy one or both of the disks. I do not know if this is the fault of the drive or the controller — but let the buyer beware!

Now, what's coming up for the future? I've started a new project — evaluating add-on keyboards, and will also be looking at more work-alikes. The promised article on my new school will be done during the Fall for early Spring publication as will a piece on CPM. At some later date, I plan to look at some of the newer disk drives and at word processors. (Anybody want to try to convince me that they have a better one than Screenwriter? Send one along — the evaluation will be thorough and honest.)

It's been a slice, but I do have to get busy and plan Nellie Hacker's graduation ceremony, so — 'bye for now.

The loan of equipment to make this review work possible is greatly appreciated and I would like to thank the following stores:

for the SYSCOM — Sanford Electronics Ltd. 7375 - 19 St., Burnaby B.C. and their retail outlet Clover City Sound in Cloverdale.

for the Franklin ACE 100 — Computer Town 418 - 6 St. New Westminster B.C.

for the Basis 108 — Clearbrook Computer Centre 2591 Cedar Park Place, Clearbrook B.C.

for the Apple IIe — Paragon Computers 567 Clarke Road, Coquitlam, B.C.

	][+	SYSCOM	Franklin	Basis 108	*//*e
Innovativeness	6	0	3	8.5	9
Faithfulness to][+	10	6	9	8	9.8
Compatible to *//*e	6	5	5	7	10
Physical Considerations					
• Size/Portability	5	5	4	3	5
• Rear connections	2	2	2	8	5
• Case quality	8	7	8	9	8
• Power supply	8	4	9	10	10
• Ease of use	7	6	8	7	9
• Fan included	NO	NO	YES	NO	NO
Overall	6	5	6	7.5	7.5
Reliability	9	1	8	9.5	9.5
Keyboard					
• Detachable	NO	NO	NO	YES	NO
• U/L case	NO	NO	YES	YES	YES
• Convenient case lock	N/A	N/A	YES	NO	YES
• Keypad	NO	NO	YES	YES	Opt.
• Extra arrow keys	NO	NO	NO	YES	YES
• Break/Pause keys	NO	NO	YES	NO	NO
• Relocated reset	NO	NO	YES	YES	YES
• Visicalc keys	NO	NO	YES	YES	NO
• Function keys	NO	NO	NO	YES	NO
• Selectric compatible	4.5	4	9	9.5	9
Overall	4	3	9	9.5	7
Special Features Included by Manufacturer (All are available in peripheral boards)					
• 80 column				YES	Opt.
• Serial port				YES	
• Parallel port				YES	
• RGB				YES	
• Z-80				YES	
Memory maximum	64K	64K	64K	128K	128K
GRAND TOTAL RATING	6.9	3.3	6.8	8.3	8.8

Note: I know of no computer presently available that would rate an overall nine on an idealized scale. A combination of all *//*e and Basis features could get as much as 9.2 though.

THE GAMING ROOM:

OUT-WIZARDING WIZARDRY

Christopher H. Williams

THE Wizardry pointers in the August issue were a little cumbersome to use. Creation of some types of super-powerful characters can be done without fiddling around on the disk. Also, the article omitted a couple of important playing tips that all Wizardry players should know.

In the article, Mr. Ude talked about turning off your Apple to save your characters from death. Unfortunately, he left out a minor problem with this method. If you do turn the Apple off, the party members will be exactly like they were before you started playing. For example, if you gave all your characters shields+1 before you went on the expedition, the characters would not have the shields after you recovered them. They would, however, have the gold that they had spent on the shields.

In my opinion, there is a little easier way to double the amount of good magic items that you have. What you do is this. Backup all your characters using the backup option in Wizardry's utilities. You will need a formatted disk to do this. Then create a new scenario disk using the scenario duplicate creation option also in the utilities. Now here's the tricky part. Go into the backup option again and insert the backed up characters disk you just made. Respond to the question "To or From?" with an "F." The disk will spin and you'll be asked to insert the scenario disk. Insert your newly created scenario disk and behold, you will have two copies of all your characters, as well as any magic items they happened to have on them. You can easily get these goodies back to your original scenario disk by giving them all to one character and transferring the character to your original scenario disk by using the Transfer option found in the utilities. This method does not allow you to double items that cannot be transferred like the keys and the blue ribbon. The beauty of this scheme is that you can keep backing up the characters from the disk for as many times as your little heart desires. This creates a veritable wasteland of Dragon Slayers, Shields+1, and Mage Mashers.

There is a valuable undocumented feature in Wizardry that no player should be without. This feature enables you to create at whim a 200th (and above) level bishop. It only works on bishops, however. The procedure is as follows:

1) Take a bishop into the camp area. This can be done easily by taking the bishop into the maze because you always camp before going into the actual dungeon.
2) Inspect the character by pressing the number corresponding to the bishop.
3) Press "I" for identify.
4) Type "9" for the item number. The number of items your bishop actually has makes no difference.
5) If the computer responds "failure" keep trying until you get "success." Sometimes it takes a while to get "success," so hang in there.
6) When you get "success," your character will automatically have 100 million experience points!!
7) To get the bishop up to maximum level, leave the character, leave camp, go up the stairs, go to the Adventurer's Inn, and start pressing "A." It will take some time to get the character up to max, but believe me, it's worth it.

There are several things you can do with your super-bishop. You can take the bishop down and single-handedly defeat Werdna (which happens to be Andrew spelled backwards). I use my super-bishop, Friar Tuck, to identify all the items I get from the dungeon. This saves me a lot of gold because I never have to pay those outrageous fees that Boltac charges to identify items. By the way, if you didn't know it, Boltac charges one-half the value of the item just to identify it. This fact can be used in determining what the object is. For example, if Boltac wants 150 gold pieces to identify a potion, it is a good bet that it's a latumofis potion. If you've got ten latumofis potions, you don't want to shell out 150 for another one.

Another thing you can do is change the bishop's class. With straight eighteens, the bishop can be almost anything; I say almost because of the alignment restrictions on some classes. This new character has a distinct advantage in that it can use *any* spell in the book. The bishop doesn't have a lot of spell points per level, however. In fact, the character has the number of spells on each level as their spell points per level.

One final tidbit of information. The authors of Wizardry, Andrew Greenburg and Robert Woodhead, put themselves into Mad Overlord. As I already pointed out, Werdna, the evil mage who stole the amulet you're trying to retrieve, is Andrew's name spelled backwards. Trebor, from whom Werdna stole the amulet, just happens to be Robert's name spelled backwards. Happy Wizarding!

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Michael Thyng

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Introduction

CHEQUEMATE PLUS is, by their definition, "the finest, easy-to-use home financial packages available for your Apple][or Apple][Plus microcomputer." It is, by my definition, a small business financial bookkeeping system but not as easy to use as they imply. This package is so sophisticated I doubt the average person using it at home would make use of many of its many features. It could be a wonderful system for the small business wanting to get the most for its software dollar. While ChequeMate PLUS is easy to use after learning the system, it does require working your way through many of the alternative paths. Let there be no mistake, I like this package. Now, let's see what you get for your $79.95.

Package Features

ChequeMate PLUS comes with documentation and one diskette with all the programs you need to run the system. Lo and behold, the programs are written in Applesoft and they are not copy protected. Therefore, if you want to have your systems analyst design an interface to some other system, no problem. Simply use COPYA to back up your programs and files.

The documentation walks you through the process of start-up and use of the system. It even shows a system flowchart to give the user the overall picture of the ChequeMate PLUS package. Once you know the system, the documentation can answer most of the user's reference needs.

One negative point, the user must carefully follow the documentation. You cannot sit down and expect to use the program without following the necessary steps. In order to set up an Account Data File, you must know the necessary terminology. For example, what is ITEM? ITEM is a check number, but it requires a prefix as it could also be a deposit, bank charge or automatic teller transaction. Again I stress, one *must* read the documentation in order to use and take full advantage of this product.

This package has a number of valuable features. You can record data for checks from multiple bank accounts. I tried three different accounts, and the system handled them fine. Nothing tells what the upper limit is, but I suspect that it is more a function of space on disk than software limitations.

Another *bonus* this package offers is something called the STANDARD DATA FILE. Suppose you had some places to which you wrote checks each month, same place month after month. ChequeMate PLUS lets you define those places once and refer to them by number, calling that data each month as the need arises. *Business bookkeepers, pay attention.* Do you have regular pickup by United Parcel Service? Do you find you are writing checks to them many times a week? Enter them into your Standard Data File and save yourself some effort. Isn't it amazing what computers can do?

The program I found the most difficult was the Budget Data File. I wanted to run the system without any reference to a budget. Wrong! The Budget Data File is the spot where you define your chart of accounts. You are given the space to prepare an estimated dollar figure for an account by month. After the month has past, you can go back to that account and enter the actual amount of money charged to that account. Remember, we haven't even started talking about the reports available yet. Therefore, you can enter the checks and related data you need to define your chart of accounts. Makes sense.

Let's complete the cycle and describe the Charge Data File. This file describes your current (and not so current) Accounts Payable. You can enter your check data into the Check Data File which will display up to three pending charges. With the check data input, you can add, change, or delete information for any check you enter. You must specify which account you are charging this check against by telling the system the date, payee, and amount. You also describe the category — this is the reference to the chart of accounts data in the Budget File — and a comment, tax code (deductible, non-deductible, something like that) and a status code. The status codes are 0 for outstanding checks, C for cleared checks, and P for checks that should be printed when you select the print option.

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All reports are set up to be run within the space 80-column paper allows. Reports can be sorted on any one or two fields. You can limit the data reported by using from one to three limits. In other words, if you desire to print out only the cleared checks, indicate the limit field to be status and the limit data to be C. Data parameters may be entered to create minimum and maximum limits on the limit fields. Reports can be obtained by using the Account list. This is your report of the current bank balances for each account you have recorded and run transactions against. You can also display the list of your Standard entry file, and, of course, list your checks. Again, remember these can be sorted or limited to meet your needs. There is a budget listing report, with a comparison report of budgeted categories by individual months. The Charge List Report will give you a summary by account of the dollars you owe.

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reviews

CHEQUEMATE PLUS

You can use ChequeMate PLUS to print checks. The documentation even tells you from whom you can order customized checks for use with the system. Or, if you want a different format, you can always go into the Applesoft program that does the printing and make any format you want. *Bookkeepers, take note:* This system gives you a Balance Sheet and an Income Statement.

Summary

ChequeMate PLUS requires time to master. I think three to four hours wouldn't be unrealistic. For a home system, I personally feel this is too much. In a business atmosphere, this would be reasonable and a worthwhile investment. To enter data, the user is prompted to enter several details for each entry. For business bookkeeping, this is great. For home use, I think the average user would tire of entering data. But, if you want to keep track of where your money is going, you're sure going to know with this system. The menu driven approach for choosing the particular activity is a good approach. It doesn't overburden the user.

If you want a system to just play around with, forget ChequeMate PLUS. It's a sophisticated system, offering many features at a low cost. Yes, you *are* getting your money's worth.

reviews

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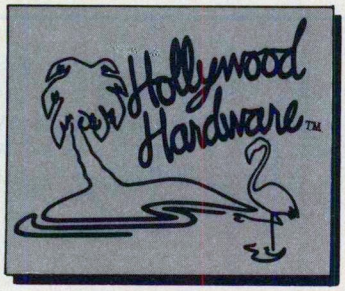

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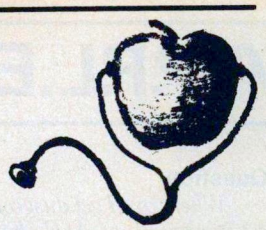

Bruce F. Field

Question:

I think I may have a problem with my power supply. When I first boot up, the text on my monitor will often be "wavy" and flickering. As the day wears on, the text "firms up" and the problem seems to disappear.

Answer:

The problem may be with your power supply, however I am inclined to suspect other things. First, I would check the cable from the video output on the Apple to the monitor. The best way to check it is to replace it with another cable (at least temporarily). If the display is flickering, this is usually the problem.

Sometimes other equipment placed close to the monitor, notably another monitor, will produce interference. Try turning off any nearby equipment.

There is an adjustment inside the Apple in the rear right-hand corner that controls the video signal level to the monitor (see the Apple Reference manual for the exact location). Changing this small potentiometer may help your problem. You can't damage anything with this adjustment so you might as well go ahead and play with it.

If the problem is repeatable, I would try leaving the video monitor on overnight but leaving the Apple off. In the morning if the text is "firm" when you first start, the problem may be in your monitor.

Make sure that both the monitor and the Apple are plugged into grounded (three wire) sockets that are common to one another. What I mean is don't have the Apple plugged into one socket on one side of the room and the monitor plugged into a socket on the other side, plug both into a single duplex outlet or a three wire extension cord.

If all of these tests fail, I would take my Apple to a dealer and have him put the power supply output on an oscilloscope, this should indicate if there is any problem with the power supply.

Question:

I have a program that I wish to be able to access one or two disk drives, depending upon the users' configuration. My problem is that I want to be able to access the second drive automatically, without having to ask the user. Is there a technique, or a location that can be looked at, that will enable me to tell from within a program whether the second drive is connected to the controller?

Answer:

There is no way of telling if a disk drive is connected and contains a diskette without trying to read the diskette. One way to do this is to execute the DOS command VERIFY. If you try to verify a file that exists on the disk and if everything is okay, DOS just returns to your program. If the file doesn't exist, DOS returns with a FILE NOT FOUND error. If there is no disk drive or a diskette isn't in the drive, DOS returns with an I/O ERROR. You can use the ONERR command in Applesoft to sort out what is happening. The program segment below should get you started.

```
500     REM CHECK IF DRIVE 2 IS WORKING
510     ONERR GOTO 550
520     F = 1 : REM INITIALIZE FLAG
530     PRINT CHR$(4)"VERIFY XXXX,D2"
540     GOTO 560 : REM SKIP ERROR CHECK
550     IF PEEK(222) = 8 THEN F = 0 : REM I/O ERROR SETS F = 0
560     POKE 216,0 : REM TURN OFF ONERR
570     REM IF F = 0 THEN NO DRIVE 2
580     REM IF F = 1 THEN DRIVE 2 IS WORKING
```

This program will not be correct if by some chance a file named XXXX does exist on the disk and it somehow was recorded incorrectly, because if VERIFY finds a bad file it returns an I/O ERROR, thus fooling the program into thinking that the drive isn't working.

There is no way to just test if a disk drive is connected without having a disk in it.

Question:

I understand it is not a good idea to turn your Apple on and off all the time, but how can you get out of programs that won't let you reset, forcing you to turn off?

Answer:

The main concern in turning your Apple on and off is the weak power switch on the back of the Apple. If you use this switch a lot, sooner or later (usually sooner) it will fail. Originally this meant that the entire power supply had to be replaced ($$$) for a 50 cent switch. Now I believe the dealers can replace just the switch ($$). The best solution is to get a power strip type extension cord and use the switch on that to turn everything on and off. An additional advantage is that you won't accidentally forget and leave some peripheral on.

It is probably better for the electronics in your Apple if you leave it turned on rather than turning it on and off for short periods of time. The chips inside the Apple do not wear out from use but are somewhat sensitive to power surges that occur when the machine is turned on. Woz says he leaves his machine on all the time.

Question:

After editing an Applesoft program using the normal edit features of the Autostart Rom, when I request a save or other DOS command the Apple often responds with a ?SYNTAX ERROR. How can I avoid this inaccurate trivia?

Answer:

Are you questioning your computer? If it says SYNTAX ERROR, you have a syntax error. The problem is that when you are through editing, you may still be in the ESC mode, so that the next character you type is not recorded on the screen. Thus your command is short one character and incorrect. Or, you may have either copied over something without realizing it or you have typed a control character that does not appear on the screen. Then when you type a DOS command or any other Applesoft command, the extra characters that are already in the keyboard buffer will cause a syntax error. One way to get around this is to type [Ctrl-X] to erase anything in the keyboard buffer before typing the next command.

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letters

A.P.P.L.E. DOCTOR

Question:

Where can I get dust covers to fit various configurations of Apple hardware?

Answer:

Cover Craft makes a number of flexible vinyl dust covers for the Apple and several monitors. Local computer stores probably can get these for you, they run around $10 to $15. SACON (315 E. Diamond Avenue, Gaithersburg MD 20870, tel. no. (301) 258-9505) can order a wide variety of covers to fit many combinations of Apples, disk drives, and monitors. These go for $12 to $17.

Question:

How can I restore the DOS 3.3 tracks on a disk after they have been blown without wiping out other programs on the disk?

Answer:

BRUN the MASTER CREATE program on your system master diskette. This program is intended to convert a "slave" diskette to a "master" diskette bootable on any memory size machine. It does this by writing a new copy of DOS to the first three tracks on the diskette. How to use this program is described on page 44 of the DOS Manual or on page 106 of the new DOS Programmer's Manual.

MASTER CREATE will only work if the initialization of the first three tracks is still intact. If MASTER CREATE is unable to rewrite DOS, then the best solution is to use the FID program on your system master diskette to copy all the programs to a new diskette. FID is described starting on page 184 of the DOS Manual but seems to have been overlooked in the new DOS User's and Programmer's Manuals. Fortunately it is fairly obvious how to use it, just BRUN FID, choose the menu option to copy files, enter your source and destination disk drives, insert an initialized diskette in the destination drive, and enter = (an equals sign) when it asks you what file name to copy. Equals is a wildcard character and this will cause all the files on the source diskette to be copied to the destination diskette.

Alternatively, *Bag of Tricks* (Quality Software, Reseda, CA) will allow you to reinitialize tracks 0-3, after which you may use Master Create.

Question:

Where can I find information on the one wire modification for upper case characters?

Answer:

Basically it involves running one wire from the shift key to pin 4 of the game I/O port. How to do this is explained in the Superscribe II manual. Richard Langston had an article in the July 1983 Washington Apple Pi Journal on this subject. A Shift-Key Modifier kit is available from S-C Software (P.O. Box 280300, Dallas, TX 75228, tel. no. (214) 324-2050) for $15 that contains all the parts and instructions you need. Another article *Curing a Shiftless Apple* by Dan Paymar, appears in the May 1982 *Call -A.P.P.L.E.*

Question:

Can I sort names in VisiCalc?

Answer:

The answer is that you must do it manually line by line using the Move function. In other words no. Multiplan does have a sorting option with the limitation that it will only handle 255 records in one file. Also sorting is done by row, each record must be limited to one row and the entire row is moved along with the name being sorted.

Question:

Where can I purchase a communications card kit or plans? My goal is to interface a standard modem to the Apple without having to buy a communications card. Could I run it from the game I/O port?

Answer:

I don't know of anyone that is specifically producing a comm. card kit, however you might check with John Bell Engineering (they advertise in *Byte* magazine) they offer several cards in kit form.

Richard Campbell had an article in the April 1979 issue of *Byte* (pp. 20-25) describing a simple communications card using the Intel 8251. Although the 6502 in the Apple violates the timing specifications of the 8251 it still seems to work. However, you will have to write the software to make the Apple behave as a terminal.

You should also look into the Multi-Tech modem, an inexpensive direct-connect modem that is Hayes compatible. It is available to A.P.P.L.E. members for $195.

Question:

I have seen advertisements for voltage surge protection, perhaps including near lightning strike protection. What about E.M.P./line voltage protection? Will the commercially available fan/combo surge protector protect against up to instantaneous surges of 100,000 volts? And against E.M.P. (electromagnetic pulse) from nuclear explosions?

Answer:

Most surge suppressors on the market offer protection against one or both of the following problems, voltage surge, and/or electromagnetic interference. Voltage surges on the power line can be caused by lightning striking at or near a power line, motors turning on or off, or a sudden change in the load on the power line. At the heart of all these surge suppressors is a small device called a "varistor" that absorbs the extra energy if the line voltage gets too high. What you want to look for is the energy rating of the varistor, the higher the better. None of these devices are going to withstand a direct lightning strike on the power line, then it's baked Apple time. So it's not a bad idea to unplug your Apple during a thunderstorm.

When it comes to electromagnetic or radio frequency interference, (RFI) protection is less important than surge protection. There are two things that can happen without this protection. One, RFI can come in the power line and upset the operation of the Apple. It would likely take a very large signal to upset the Apple and it shouldn't get through the power lines. Two, RFI from the Apple could be put on the power lines upsetting other equipment (i.e. TVs). It turns out that most of the RFI generated by the Apple travels through the air and not the power lines. Adding this kind of filter won't do much, if anything, to help your TV reception.

Electromagnetic pulses from a nuclear explosion will be airborne. Putting something on the power line will not help with this problem.

Question:

I have been having trouble finding a screen dump program for an Apple //e to an Epson MX100 printer. Where can I get one?

Answer:

Since the MX100 is a popular printer, there are several programs to choose from. Printographer by Southwestern Data Systems will dump the High-Res

—●→

letters

screen, or a portion of it to a printer. You may select a magnification from 1 to 9 and can save the screen to disk in a compressed format.

Another highly recommended program is Zoom Graphix by Phoenix Software. This program can print the entire screen either vertically or horizontally, or print a portion of the screen in your choice of screen proportions. This is one of the most versatile programs available.

Graphtrix by Data Transforms, Inc. supports a wide variety of printers and interface cards. Portions of the screen may be printed in three different magnifications. Graphtrix can be used from a BASIC program and comes on an unprotected diskette.

Question:

I am having trouble with my game I/O port, neither my joystick or paddle work. I have a paddle-adapple and a shift key mod. Neither control works from either the port or the paddle-adapple. Any ideas on what the problem is?

Answer:

The game I/O port has three different functions, four digital outputs (not used with paddles or joysticks), three digital inputs (one for your shift key mod and two for the paddle buttons), and four analog inputs (two are used for the paddle knobs or joystick). We will assume that at least either your joystick or paddles work, although you might borrow a friend's just to make sure or try your paddles on another machine.

Before tearing apart the Apple or replacing chips, I would write a simple program in Applesoft to convince myself that the paddles are really not working. For this test, dump the paddle-adapple and plug directly into the game I/O port. Try the program below.

```
100     PRINT PDL(0):GOTO 100
```

Run this and turn both paddles, if the number changes with one paddle it's okay. Now change the zero in the PDL function to a one and try it again with the other paddle.

To test the buttons run this program.

```
100     PRINT PEEK
(49249)>127:GOTO 100
```

Push the paddle buttons, the number should change from 0 to 1 when you push one of the buttons. To test the other button, change the 49249 to 49250. If you've verified that it is really not working, read on.

If you have an Apple][or][+ the 558 chip at location H13 is the one that is used to read the analog inputs. If you turn the knob and nothing happens, this is the chip that probably isn't working. The chips on the circuit board in the Apple are laid out more or less in a grid pattern. The "rows" of chips are labeled along the left side of the board using the letters from A to K. The "columns" are labelled along the front side from 1 to 14. So, H13 is the chip in the seventh row from the front and the thirteenth column from the left.

If the paddle buttons don't work, the problem is usually the 74LS251 at location H14.

letters

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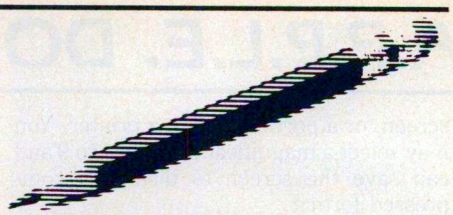

Dear Sir:

YOUR most recent addition to the In Depth series, *All About DOS,* is by far one of the best collections of "how to" articles on DOS I have seen. The article by Lee DeRaud, "Cutting Down On Overhead," was particularly interesting and likely a real money-saver for your readers. Unfortunately, the SAVEDOS program (for saving any modified DOS to a preformatted disk) has a number of troublesome errors which need attention.

One of these errors was pointed out by Marsh Barton in the July 1983 issue of *Call -A.P.P.L.E.* Unfortunately, there must have been a misprint in reporting Barton's fix. The idea is good, but the implementation is faulty. Instead of STA $AA5F following line 37 in the program, the correct code should be STY $AA5F. It is the "Y" register that contains a zero value at that point in the program, not the accumulator.

There are three other problems with DeRaud's program which should be corrected. The corrections are quite simple and can be entered in a few minutes using any assembler.

I'll bet no one ever tried to do anything but boot the disk after they used the SAVEDOS program. If so, I'll bet they were as surprised as I was to find the familiar "SYNTAX ERROR" response to any DOS command. At lines 38 and 39 of the program, DeRaud quite properly turns DOS off before he begins his work. The problem is he leaves in too much of a hurry, forgetting to turn DOS back on as he exits. The problem, however, does have an easy fix. Simply replace the RTS instruction at line 100 with a JMP $A851, and exit through the DOS routine that turns DOS back on.

While you are down near the bottom of the program, the code at line 101 won't do you any good for error handling. DOS looks for that code in the accumulator, not the "X" register. Change the LDX #8 instruction to an LDA #8 and you'll have no problems.

Once you've made these fixes your SAVEDOS program will work just fine — as long as (1) the DOS you initially booted was a SLAVE DOS *not* a MASTER DOS, or (2) you used the INIT command at least once between booting your MASTER and using the SAVEDOS program. There is one very "minor" difference between the SLAVE DOS and an unaltered MASTER DOS once they are in the machine. The value of $B6FE is $36 for a MASTER DOS and $B6 for a (48K) SLAVE DOS. That little "signature" byte is enough to send you crashing through your RAM roof (and leave your disk drive spinning into the middle of next week) if you try to boot a DOS (from power up) that was saved by SAVEDOS after booting a MASTER (whew!). Simple fix time. Somewhere in the program — I suggest the first line of code after line 32 — insert the instruction LDA #$B6 followed by STA $B6FE.

The SAVEDOS program will now work as described. Be aware, however, that the routine assumes everyone always names greeting programs "HELLO." If you don't, you have another disappointment coming when you find that the DOS written by SAVEDOS has reset your greeting program name. I'll leave this final modification of SAVEDOS to the interested reader. It isn't hard, but too long for this letter. If you don't speak 6502, just write an Applesoft driver to load the machine language program, POKE the actual program name into the memory area starting at line 105. Then CALL 2051 to start the process. One final note (for those of you with 2 drives) on the message to INSERT DISK IN DRIVE 1. The disk should be inserted into whatever is the currently logged drive, regardless of the message.

Robert Berman
1915 Grand Court
Vienna, Virginia 22180

Dear Val:

You may not be aware of the really disastrous "Irish Apple"...the Apple *IIe* as redesigned by the Cork Factory, who were authorized to make changes to the main board to accommodate the PAL video circuitry.

While doing this, they decided to make other major changes, which included moving the 80-column card slot to the center of the board, so that it interferes physically with the regular slots, as well as altering the decoding circuits so that it is not possible to activate a card in slot 3 while the memory-expansion mode is active. One or the other, not both.

This, combined with the appalling ISO-standard keyboard layout, produces a machine which is far from pleasant to use, as well as being sufficiently different from the US *IIe* that noticeable incompatibilities have been found when running US *IIe* software on the UK *IIe* machines. U.S. Apple *IIe*'ers don't know how lucky they are! Worse, Apple UK say that they know about the problem, but don't intend to do anything about it, nor do they have any intention of discussing ways to overcome it.

Richard King
14 Wellesley Court
Maida Vale, London W9

If the facts are as stated, that is appalling. We welcome readers comments and possible solutions.

Dear Sirs:

I have owned an Apple][(remember Integer ROM?) since January, 1980. Unequivocally, I have never purchased a piece of hardware or software more satisfying than the *Synetix Solid State Disk* Model 2201. Initially, I purchased the 128K RAM version, but I would strongly urge your readers to forge ahead to the full card implementation.

Intergration with software is generally excellent as the RAM appears as a lightning fast disk drive. The manual is straightforward and useful. What is more, as packaged through A.P.P.L.E., it comes complete with three disks of BASIC, CP/M, and PASCAL software, Boot and run!

Telephone support, via 800 number no less, is superb. Steve Ross of Synetix was very helpful in helping me adapt Pascal drivers to my desires. He even went so far as to advise awaiting a new Pascal driver that was not only faster but less expensive!

Lawrence K. Simon, M.D.
4 Crestwood Rd.
West Hartford, CT 06107

letters

WRITE -A.P.P.L.E.

Dear Mr. Golding:

After several hours of working on one program, getting it to where I wanted it, I saved it to my disk, and went on to work on another one. After a few changes I saved it, and, you guessed it, used the name of the first program. Of course, I hadn't backed up the first program so I was out of luck. However, this stimulated my thoughts and I came up with the little one-liner to add to my programs so that I can never save one program under another's name unless I really want to. At line 63000, simply add the following statements:

```
63000 PRINT CHR$(4)"MONICO":
      PRINT CHR$(4)"UNLOCK
      filename"
      PRINT CHR$(4)"SAVE
      filename":
      PRINT CHR$(4);"LOCK
      filename":
      PRINT CHR$(4)
      "NOMONICO":END
```

Each program should have its own name (obviously) and after the first SAVE (done in immediate mode) all modifications may be saved by simply entering RUN 63000. In my programs, I have two similar lines for saving onto drive 1 and drive 2. One merely adds ",D1" or ",D2" after the first filename reference.

I hope this may be a useful quickie for other people like me who occasionally forget which program they are working on.

Peter A. Lachenbruch
1939 Calvin Ave.
Iowa City, IA 52240

Letter to the Editor:

An open letter to all users of Apple Computers who are concerned about the risks they are taking when they entrust their valuable data to Copy-Protected software:

Users of Application programs (as opposed to programmers and hobbyists/hackers) on Microcomputers will generally find that they need three major types of application programs: Word Processor, Data Base Management System, and Spreadsheet.

Now for the first time it is possible to get a great program in each of these categories which is not copy-protected.

Pie Writer (a greatly enhanced and improved version of Apple Pie) is distributed by Hayden Book Company and is, without question, the very best word processor for the Apple. No further discussion; the case is closed.

THE Spreadsheet 2.0 (also sold in stores as Magicalc) is the very inexpensive spreadsheet program sold by (A.P.P.L.E.). THE Spreadsheet 2.0 may not be the fastest spreadsheet around, but it has some features most of the others do not have, such as the ability to display in 70-column mode without hardware or 80-column mode with hardware, variable width columns, and hidden columns. In addition, some of the VisiCalc-type Utilities, such as Visiblend, seem to work quite well with THE Spreadsheet.

The Data Reporter (Version 3.0) by *Synergistic Software.* Version 3.0, the latest revision, is just now appearing on the market, and is the first version of this great DBMS to be unlocked. Now the fastest, most versatile and most fun-to-use DBMS can also be backed-up. Can heaven be this good?

For non-application uses (programming and such) there are also a number of companies currently releasing unlocked software. Almost any product from A.P.P.L.E. is assured of being a quality, useful item and of course, everyone knows of the great stuff by Beagle Bros. For graphics, Penguin Software now has a policy of unlocked software.

With this lineup of unlocked programs, it should never again be necessary to use copy-protected software.

The reason more and more programs are now being sold on unlocked disks and are still making a profit for their companies is that it has become quite clear to these companies that Application programs (as opposed to games and other trivials) are virtually useless without the documentation and manuals which go with them. Companies that continue to try and palm off copy-protected software have not yet learned that it is good, usable documentation that keeps a program of this type from being pirated, not the expensive and useless copy-protection schemes they are using, which are doing nothing but causing frustration and anger among the users of such software.

Not only are each of the programs mentioned above outstanding in their own right, but the fact that they are unlocked makes them even more attractive. I feel we should all support those companies which make it a matter of policy to sell unprotected software, and if the software is among the best in its class, what else need be said? In this way we can send a message to those other rip-off producers and suppliers that we now have quality programs for all our needs on unlocked disks, and that we no longer will be forced into buying protected software and entrusting our valuable data to the hidden innards of such programs.

Thomas E. Militello, M.D.
6932 Crest Road
Rancho Palos Verdes, CA 90274

All A.P.P.L.E. software is unprotected, including our new Multi-Trieve data base.

Dear Val,

Enclosed is a tidbit that you might find interesting. It is a comparison of several versions of DOS, and the Pro-DOS pre-release version currently being circulated. Pro-DOS will put a lot of products back on the shelf.

Ken Kashmarek
6 Cherokee Ct. RR2
Eldridge, IA 52748

	DOS 3.3	Diversi	Pronto	David	Hyper	Pro-DOS
IN#6	5	5	5	5	5	
IN#6 + LOAD						
RAM	18	8	8	9	8	
SAVE	35	7	7	31	7	15
LOAD	24	7	7	6	6	4
BSAVE	30	7	7	31	7	16
BLOAD	25	6	6	6	6	5
READ	85	25	85	85	85	15
WRITE	85	26	85	85	85	15
VERIFY	6	6	6	5	5	

Figure 1. Speed Comparison (Seconds)
Date: 15 October 1983

letters

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TOMORROW'S APPLES TODAY

Kevin O. Donohoe/editor

NOTE: These products are presumed to be state-of-the-art. Call -A.P.P.L.E. does not necessarily endorse products published in this column as we have not tested them.

GUIDE TO DOING BUSINESS WITH SOFTWARE PRODUCERS

Technique Learning of Dobbs Ferry, New York, announced this week the publication of the *USMI: Market Directory,* (The USMI — Universal Software Market Identifier — is a software registry system introduced by Technique Learning in January) a unique looseleaf guide to doing business with software producers.

The *USMI: Market Directory* is the only directory that focuses exclusively on providing the microcomputer trade — computer stores, book and electronics retailers, office equipment dealers, distributors, suppliers, and consultants — as well as libraries and end users with current and comprehensive profiles of software publishers. Only first-hand information supplied directly to Technique Learning by software producers is included in the *USMI: Market Directory.* Published in an easy-to-use, convenient 8½" x 11" looseleaf format, it will be expanded and updated six times a year.

The *USMI: Market Directory* offers users six ways to locate publishers: By key subject index (such as education, financial analysis, real estate planning, etc.); by microcomputer system the software is programmed for; by operating system; by company; by geographic location; and by USMI registration number.

The *USMI: Market Directory* is available at a special introductory price of $195.00 per year, including all six updates. Inquiries should be directed to David Cohen, Box P, Technique Learning Corporation, 40 Cedar Street, Dobbs Ferry, New York 10522, (914) 693-8100.

"TYPE-WRITER," MULTI-LINGUAL WORD PROCESSOR

Any Apple computer can now be transformed into a powerful, multi-lingual word processor with TYPE-WRITER, a new computer program developed the The Professor and distributed by Gessler Educational Software — America's oldest and largest publisher and distributor of supplementary foreign language teaching materials. Type-Writer provides its user with the ability to write and edit letters, reports, or any type of text in both upper and lower case in any one of ten foreign languages as well as English.

Type-Writer includes with its disk, a detailed, step-by-step instruction booklet which explains in simple language how to: enter the text; delete or change characters, words, line or paragraphs; search for specific sections; preview the format graphically (review the margins, spacing, lines per page) before printing; print; and, finally, store the text. Specially accented letters contained within the program allow the user to perform all of these word processing functions in Danish, Finnish, French, German, Hawaiian, Hungarian, Italian, Norwegian, Spanish and Swedish. No hardware modification is needed for the accented or upper and lower case letters.

Type-Writer is designed for the Apple][+, *IIe* or any Apple compatible computer. Suggested retail price is $69.95.

For more information contact Jessica Kersey, Empire State Building, Suite 1101, 350 Fifth Avenue, New York, NY 10118, (212) 947-9898.

FRENCH AND SPANISH VERSIONS OF "HANGMAN"

Save an endangered aristocrat from the sharp blade of the guillotine or help a bullfighter stop the charge of an enraged bull and learn French/Spanish vocabulary words at the same time with *La Guillotine* and *La Corrida de Toros* — two new language computer games from Gessler Educational Software. Both programs are based on the popular "Hangman" word game in which a player is given the number of letters of a word and must guess that word by selecting the letters to fill in. Settings for the games reflect each country's heritage. The color graphics in *La Corrida de Toros* depict a bull-fighting arena, with the matador and bull prepared for confrontation. In *La Guillotine,* a Parisian square appears with a crowd of peasants clustered around the guillotine. (The Bastille is in the background.) They are waiting for a nobleman's head to roll into the basket. Background music accompanies the color graphics.

La Guillotine and *La Corrida de Toros* provide hours of French and Spanish vocabulary instruction and are presented in a fun-to-use format. They are available for the Apple][+/*IIe*, TRS 80 I, III, IV at a suggested retail price of $27.95. (However, there is no sound in the TRS 80 versions.) Gessler Educational Software, a division of Gessler Publishing Company, continues a 50 year tradition of providing supplementary foreign language materials that are both educational and enjoyable.

For more information contact Jessica Kersey, Empire State Building, Suite 1101, 350 Fifth Avenue, New York, NY 10118, (212) 947-9898.

CYCLONE UNLEASHES PATRIARCH I

Cyclone Software of Washington, D.C. announces PATRIARCH I, its flexible and innovative power tool for genealogists.

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Cost: $195.

For more complete information and sample printout of the unique and powerful Patriarch I, contact: Cyclone Software, 3305 Macomb Street, N.W. Washington, D.C. 20008 or call (202) 362-8740.

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TOMORROW'S APPLES TODAY

HIGH-RES PICTURE CATALOG

Electronic Playground, an educational program for the young learner, is the newest release by Software Entertainment Company. Designed for children 3-8 years of age the program is divided into three parts: *Matchbox* — a three part game that allows matching of shapes, upper to lower case letters, and numbers; *Magic Blackboard* — a drawing and coloring program that allows finished pictures to be saved on Picture Disks; *Heidi's Program* — offering a continuous flood of colors and sounds in reward for pressing different keys on the keyboard.

The High-Res Picture Catalog, a unique feature not seen in other software programs, allows the user to save, load, and delete pictures using only a joystick. This allows even the youngest of children to perform the operation easily and quickly. The program makes the use of "icons" which are symbols representing objects or tasks performed by the program, a feature found on Apple's LISA system. The icons make the decision or selection process easier for the user.

For more information, contact Software Entertainment Company, 537 Willamette, Eugene, OR 97401, (503) 342-3495.

DOUBLE LOW-RESOLUTION AND DOUBLE HIGH-RESOLUTION GRAPHICS CONTROL WITH BASIC

Doublestuff Software Development Inc. with corporate offices located in Brooklyn, NY are proud to announce the immediate availability of doublestuff, a graphic-enhanced software package compatible for all Apple *IIe* present and future users.

The program, conceived by partners Peter Joselow and Louis Bonfiglio reinvents graphic interpretations to a new industry standard. In fact the "e" in Apple no longer stands for enhanced . . . but, pure creative excitement.

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Doublestuff is available immediately for $39.95 from our corporate offices at the following address: Doublestuff Software Development Inc., 2053 West 11th Street, Brooklyn, NY 11223, (212) 449-6300.

THE BIOLOGY TEST MAKER

The BIOLOGY TEST MAKER enables the biology teacher to make quizzes and tests of any size from a bank of about 900 multiple choice questions on four disks. Tests can be saved on copyable disks. The teacher can add his or her own questions to the test bank. Questions can be added and deleted to a test at any time. Test questions can be printed in normal or reverse order. Questions appear in upper and lower case letters on both the screen and the actual test form. Apple][sells for $75.00.

The Chemistry Test Maker

The *Chemistry Test Maker* enables the chemistry teacher to make quizzes and test of any size from a bank of about 750 multiple choice questions on four disks. The set of four disks for any Apple][sells for $75.00.

Contact J & S Software, 140 Reid Ave., Port Washington, NY 11050.

GAMES FOR KIDS

Games for Kids includes twenty carefully crafted games which appeal to boys and girls aged 3 through 12 years. Music, sound effects and color graphics entertain children of diverse interests and skills for hours on end. Games for Kids operates on an Apple][+ or *IIe* and does not require game paddles. Games for Kids is available from: SouthWest EdPsych Services, Inc., P.O. Box 1870, Phoenix, Arizona 85001, (602) 253-6528) for $39.95.

GRADE MASTER

MICRO-Vision announces the release of Grade Master, a grade management package designed to ease the drudgery of maintaining a grade book and calculating grades while at the same time providing highly professional grade reporting capability.

Grade Master is a complete grade management and reporting package for the Apple that is easy to learn and use by both novice and expert computer users. Flexibility has been incorporated to permit its use with kindergarten through college level classes.

Grade Master features menu selection of functions and screen forms for entering student grades and information needed for generating reports. Separate program and data disks are used, permitting several teachers to use a single program disk.

Grade Master is available from dealers or directly from MICRO-Vision, P.O. Box 5311, Kingwood, TX 77325, at an introductory price of $79.

For further information contact: MICRO-Vision, P.O. Box 5311, Kingwood, TX 77325, Mike or Re Kramer (713) 358-6687.

ROADSEARCH-PLUS

Columbia Software (Columbia, MD) has introduced ROADSEARCH-PLUS, a computerized Road Atlas for the Apple][/*IIe* personal computer. This program simplifies the tedious process of determining driving routes for anyone who travels over the interstate highway system.

Roadsearch-Plus computes different types of routes. The most powerful program determines and prints the shortest practical route between cities in its database. This program also avoids toll or other roads if desired. Another program develops routes which may be longer, but more suitable to a user's specific needs.

Roadsearch-Plus contains a database of 406 cities/road intersections and about 70,000 miles of interstate and major through highways throughout the U.S.A. and Canada. The program also contains a powerful *Roadmap Development System* that lets a user customize their roadmap with up to 50 additional cities or road junctions and 100 additional road segments anywhere in North America. The user can add local roads, favorite shortcuts, new destinations and keep database current with the latest roadmap revisions.

The printed outputs from Roadsearch-Plus are an excellent companion on any trip. They include the driving route, distances, travel times, and fuel usage in different formats.

Columbia Software is continuing its policy of delivering unlocked software. This means that back-up copies can be made with most standard copy programs. All Columbia Software carries a 15 day *Moneyback Guarantee.*

Roadsearch-Plus retails for $74.95. For users not requiring the sophistication of a *Roadmap Development System,* Roadsearch is still available for the low price of $34.95.

For more information contact your dealer or Columbia Software, P.O. Box 2235A, 5461 Marsh Hawk, Columbia, Maryland 21045, (301) 997-3100.

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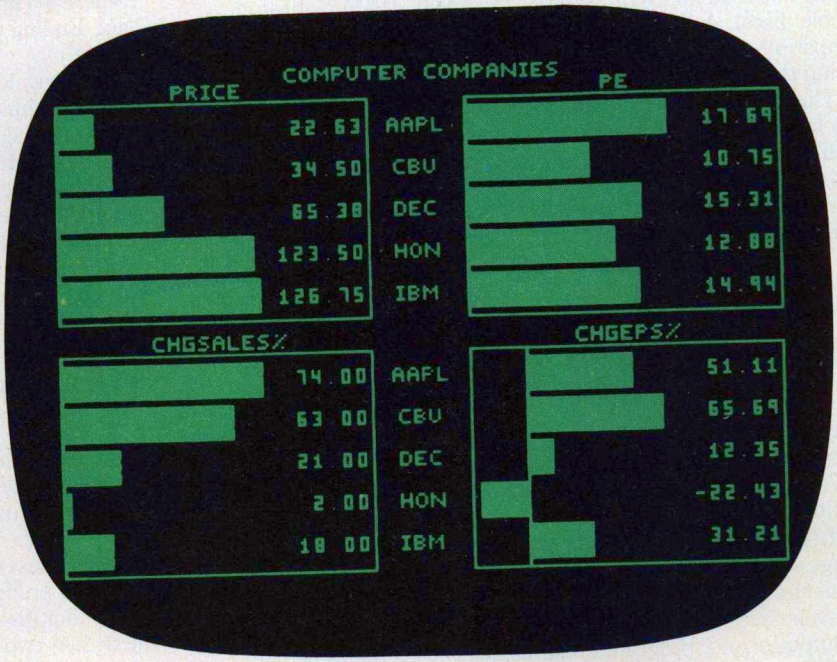

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Circle 43 on Reader Service Card

NEW DISK CONTROLLER SUPPORTS 8" DRIVES

Data-Cue's new DiscMaster II board allows you to connect two 8" or two 3½" double density disc drives to your Apple][or Apple-compatible computer.

Using DiscMaster II the Apple][will support single and double sided eight inch drives such as the Shugart 801/851 series and Shugart-compatible drives, as well as the Sony 3½".

The DiscMaster II package includes software drivers to run under DOS 3.3, PASCAL 1.1 and MicroSoft CP/M. These drivers allow you to use your existing disc drives in concert with drives controlled by the DiscMaster II board. DiscMaster II will also read and write standard CP/M 8" (IBM 3740-compatible discs). A DiscMaster option to read and write IBM PC compatible discs is under development and will be available during the third quarter, 1983.

The board contains integrated ROM and RAM memory which can be used to store the drivers, leaving the Apple][main memory free for use by your programs. Standard Utilities, including FID and FILER can be used to transfer files from drive to drive.

Data-Cue's DiscMaster II Packaged includes installation and integration instructions and is priced affordably at $265.00, and is available from Data-Cue, 5696 Hwy. 431 South, Brownsboro, AL 35741, (205) 883-2933.

COMPUTER POWER PROBLEMS AND SOLUTIONS DESCRIBED

Power irregularities that disrupt computer performance are examined in a brochure just released by Clary Corporation.

The new four color, eight page Clary publication outlines solutions to problems such as the various weather, local electrical, and on-site conditions that may lead to brownouts, voltage sags and surges, momentary outages and high intensity transients. Power anomalies such as these can cause annoying inconveniences — or costly chaos.

Output errors, program erasures, loss of irretrievable data, unscheduled shutdowns, system degradation, equipment damage and loss of revenue or work in program may result. Even the most advanced systems can be crippled by uneven power flow, according to the thoroughly researched document.

To safeguard computers against energy disturbances, Clary's brochure provides recommendations for a wide range of Uninterruptible Power Systems. UPS's supply dependable AC and back-up power to sensitive computer-based equipment. A Clary UPS maintains continuous, clean power even during total line failure by drawing current from on-line batteries — without interruption or time lags switching.

A free copy of "Clary Uninterruptible Power Systems" is available by writing or calling Clary Corporation, 320 West Clary Avenue, San Gabriel, CA 91776, (213) 287-6111.

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My Secret™ is the answer to: "What if this data falls into the wrong hands?" The answer is, "It doesn't matter. Because of My Secret, they can't read it anyway." This Apple data encryption/decryption program protects any kind of DOS 3.3 file, and many others besides, from prying eyes. My Secret completely scrambles entire disks or selected files so that they cannot be read without the password that you choose. It scrambles files from VisiCalc, some word processors, graphics (either on screen or on disk), and program files and it works with many non-standard versions of DOS. Files in their scrambled form can be FIDed and transferred via modem. Only a single password of your choice is required and it can include any keyboard character. Multiple passwords can be used for added protection. "It's My Secret and it'll *stay* My Secret!" My Secret requires an Apple][Series computer with DOS 3.3 and is available for only $19.95, plus shipping, from Anthro-Digital, Inc., P.O. Box 1385, Pittsfield, MA 01202, (413) 448-8278.

ASTROCALC PROGRAM

Astrocalc is astronomical software for the amateur, the professional, and the teacher of astronomy or anyone interested in the sky and its observation (including astrologers). Date, time and location (latitude and longitude) are input and Astrocalc calculates and displays all basic data for the sun, moon and all planets. Output includes:

Rising and Setting Times plus Brightness Magnitudes, Right Ascension and Declination, Altitude and Azimuth, Ecliptic Latitude and Longitude, Elongation from Sun, Angular Size, Phase, Orbital Elements, Inclination, Eccentricity, Ascending Node, Mean and True Anomalies, Distances, Local Sidereal Time, Greenwich Mean and Sidereal Time, Beginning and Ending of Twilight, Julian Day Number, Solar Equation of Time.

Astrocalc comes with a complete manual explaining its use, with example output and an introduction to the fundamentals of positional astronomy. References are also included for those wishing to further explore the topic.

The program is easy for anyone to use and the output required is selectable by a menu. The results are highly accurate for all ordinary uses and can be substituted for reference volumes (except for special research needs).

Astrocalc is available on diskette with manual for $29.95 pp directly from Zephyr Services, 306 South Homewood Ave., Pittsburgh, PA 15208, (412) 247-5915.

DATALIFE® DISK DRIVE ANALYZER™

Verbatim is proud to announce the launch of a unique Datalife product. Born of a joint effort between Data Encore, a Verbatim company specializing in software capabilities, and Verbatim Corporation, the Datalife Disk Drive Analyzer is a self-contained system test package which automatically tests and diagnoses four critical areas of a disk drive.

This product is for use on Apple][series, Apple /// series and other disk drives compatible with those Apple systems. In less than two minutes, the user can easily and accurately discover the quality of performance in the following areas of his/her disk drive:

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MICROMOTION SUPPORTS NEW FORTH STANDARD

MicroMotion announces the availability of several printed listings including the new 1983 FORTH Standard by the FORTH Standards Team. Also available are 6502, 8080, and 8086 source listings which support both the 83-Standard and the 83-Model by Laxen and Perry.

For further information and a free 83-Standard Programming Reference Card call (213) 821-4340 or write MicroMotion, 12077 Wilshire Blvd. #506, Los Angeles, CA 90025. Listings and 83-Standard $15.00 each.

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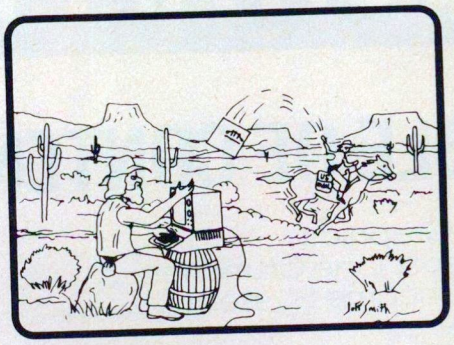

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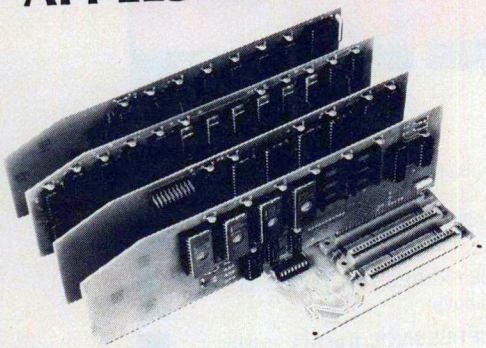

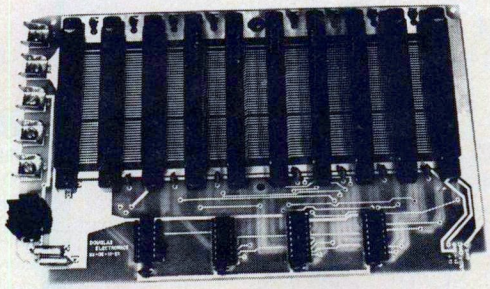

BX-DE-12 Mother Board

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Appleseed products are made for O.E.M.s and serious industrial/scientific users. Send for literature on the full line of Appleseed products; and, watch here, each month, for additional items in the Appleseed line.

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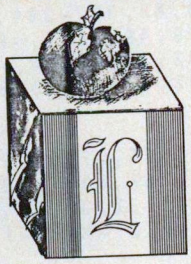

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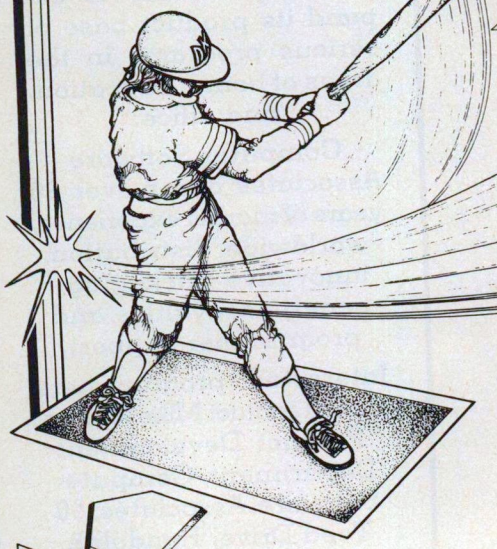

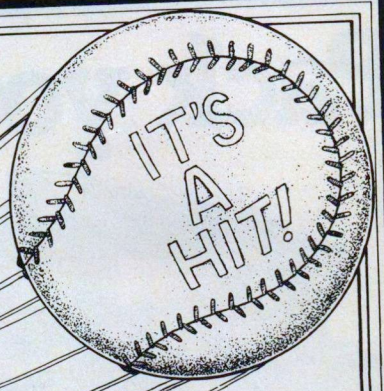

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      MICHAEL TRINDER
5   POKE 241,246
10   READ A: IF A = 0 THEN  RESTORE
     : GOTO 10
20   IF A > 0 THEN  PRINT  CHR$ (A
     ):: GOTO 10
30   CALL A: GOTO 10
40   DATA -936,-1184,-384,-198,-92
     2,-922,67,65,76,76,45,-380,6
     5,46,80,46,80,46,76,46,69,46
     ,-922,-922,-1036,-1036,32,32
     ,32,80,82,69,83,83,32,-384,8
     2,69,84,85,82,78,46,-676,-92
     2,-922,-922,-922,32,83,79,-9
     98,-1052,-380,32,87,72,65,84
     ,-998,32,68
45   DATA 73,68,32,89
50   DATA -922,79,-922,85,-998,-99
     8,32,69,88,80,69,67,84,63,32
     ,32,32,32,-912,32,32,32,7
     ,32,-1184,-922,-922,-912,-11
     84,-756
60   DATA 0
```


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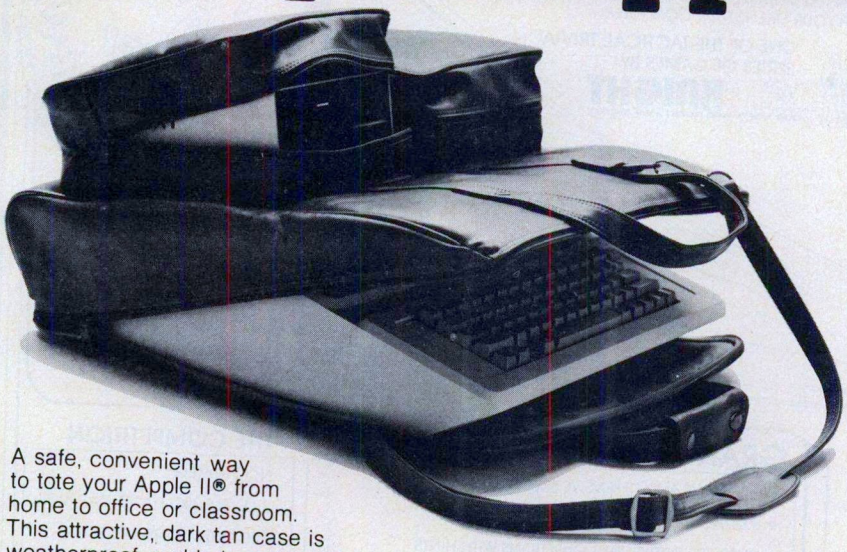

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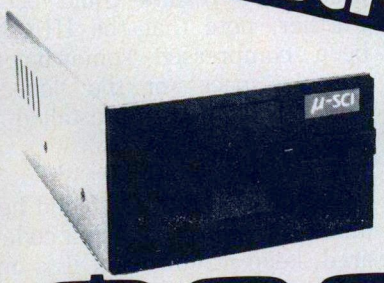

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DOS CONTINUES FOLLOWING THIS INTERRUPTION. . .
(continued from page 44)

```
40E1-D0 0B      BNE $40EE
40E3-2C 83 C0   BIT $C083
                If yes, enable
40E6-2C 83 C0   BIT $C083
                DOS addresses
40E9-A9 00      LDA #$00
40EB-8D FF 40   STA $40FF
                Reset check
                byte
40EE-68         PLA
40EF-A8         TAY
40F0-68         PLA
40F1-AA         TAX
40F2-68         PLA
40F3-40         RTI
```

If the new code is not added at this point, but rather accessed as a subroutine, the JSR should be installed prior to restoring the registers. Otherwise, the accumulator will return a #$00 to the pre-interrupt routine and unpredictable results could occur. Further, note that the IHR has been compressed somewhat to provide space for the "check-byte" routine now installed at $40F4 through $40FE.

Code has not been included here to disable the IHR. If such a code is desired, keep in mind that it is only necessary to execute a SEI instruction. The other code may be left in place since it will never be executed as long as interrupts are masked. To re-enable interrupts merely execute the previous routine (see #1 above). For further information regarding interrupts, three sources are suggested:

George M. White, Using interrupts on the Apple][system, *Byte Magazine,* May 1981, Lance A. Leventhal, *6502 assembly language programming,* Osborne/McGraw-Hill, 1979, and Richard L. Emerson, *Interrupts and Apples, Call -A.P.P.L.E.,* Feb. 1983.

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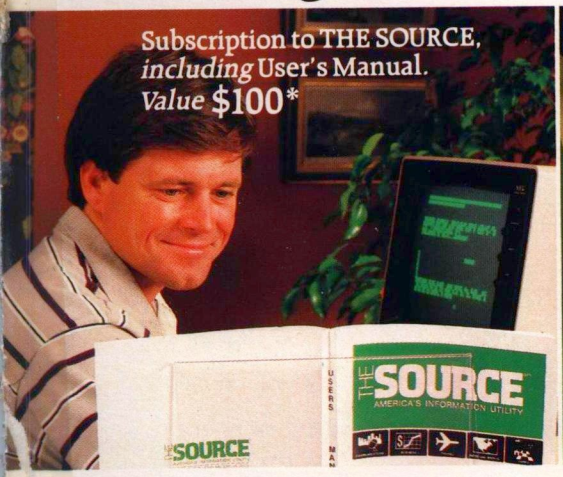

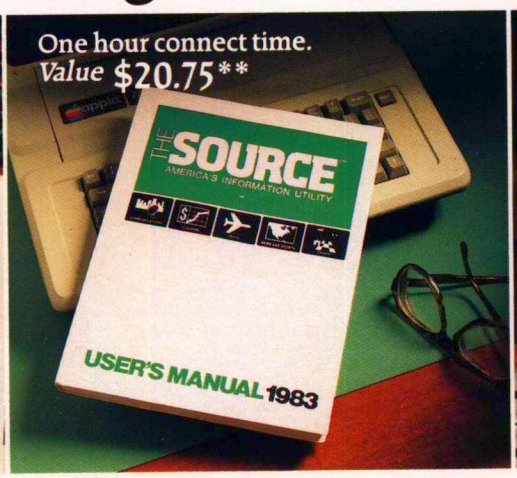

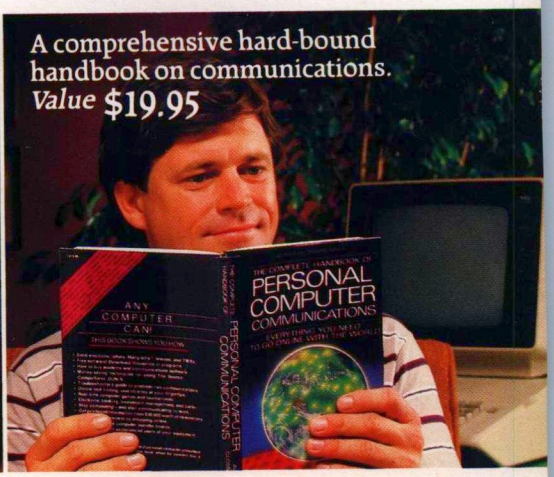

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